

Union Calendar No. 608

110th Congress, 2d Session - - - - - House Report 110-935

SUMMARY OF ACTIVITIES
OF THE
COMMITTEE ON SCIENCE AND
TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
FOR THE
ONE HUNDRED TENTH CONGRESS



JANUARY 2, 2009

JANUARY 2, 2009.—Committed to the Committee of the Whole House on
the State of the Union and ordered to be printed

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LETTER OF TRANSMITTAL

January 2, 2009

The Honorable Lorraine C. Miller
Clerk
U.S. House of Representatives
Washington, DC 20515

Dear Ms. Miller,

In compliance with Rule XI, Clause 1(d) of the Rules of the House of Representatives, I hereby submit the Summary of Activities for the Committee on Science and Technology for the 110th Congress.

The purpose of this report is to provide the Members of the House of Representatives, as well as the general public, with an overview of the legislative and oversight activities conducted by this committee, as defined by Rule X, Clause 1(o) of the Rules of the House of Representatives.

This document is intended as a general reference tool and not as a substitute for the hearing records, reports, and other committee files.

Sincerely,



BART GORDON
CHAIRMAN

Enclosure

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<i>110th Congress</i> <i>2d Session</i>	}	HOUSE OF REPRESENTATIVES	}	REPORT 110-935
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SUMMARY OF ACTIVITIES—COMMITTEE ON SCIENCE AND TECHNOLOGY

JANUARY 2, 2009.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

MR. GORDON, from the Committee on Science and Technology,
submitted the following

R E P O R T

HISTORY OF THE COMMITTEE ON SCIENCE AND TECHNOLOGY

The Committee on Science has its roots in the intense reaction to the Soviet launch of Sputnik on October 4, 1957. Early in 1958 Speaker Sam Rayburn convened the House of Representatives, and the first order of the day was a resolution offered by Majority Leader John McCormack of Massachusetts. It read, “Resolved that there is hereby created a Select Committee on Astronautics and Space Exploration . . .”

The Select Committee performed its tasks with both speed and skill by writing the Space Act creating the National Aeronautics and Space Administration (NASA) and chartering the permanent House Committee on Science and Astronautics, now known as the Committee on Science, with a jurisdiction comprising both science and space.

The Science and Astronautics Committee became the first standing committee to be established in the House of Representatives since 1946. It was also the first time since 1892 that the House and Senate acted to create a standing committee in an entirely new area.

The Committee officially began on January 3, 1959, and on its 20th Anniversary the Honorable Charles Mosher said the Committee “was born of an extraordinary House-Senate joint leadership initiative, a determination to maintain American preeminence in science and technology . . .”

The formal jurisdiction of the Committee on Science and Astronautics included outer space—both exploration and control—astronautical research and development, scientific research and development, science scholarships, and legislation relating to scientific agencies, especially the National Bureau of Standards¹, NASA, the National Aeronautics and Space Council, and the National Science Foundation.

The Committee retained this jurisdiction from 1959 until the end of the 93rd Congress in 1974. While the Committee's original emphasis in 1959 was almost exclusively astronautics, over this 15-year period the emphasis and workload expanded to encompass scientific research and development in general.

In 1974, a Select Committee on Committees, after extensive study, recommended several changes to the organization of the House in H.Res. 988, including expanding the jurisdiction of the Committee on Science and Astronautics, and changing its name to the Committee on Science and Technology.

Jurisdiction over energy, environmental, atmospheric, civil aviation R&D, and National Weather Service issues was added to the general realm of scientific research and development.

In addition to these legislative functions, the Committee on Science and Technology was assigned a "special oversight" function, giving it the exclusive responsibility among all Congressional standing committees to review and study, on a continuing basis, all laws, programs, and government activities involving federal non-military research and development.

In 1977, with the abolition of the Joint Committee on Atomic Energy, the Committee was further assigned jurisdiction over civilian nuclear research and development, thereby rounding out its jurisdiction for all civilian energy R&D.

A committee's jurisdiction gives it both a mandate and a focus. It is, however, the committee's chairman that gives it a unique character. The Committee on Science and Technology has had the good fortune to have nine very talented and distinctly different chairmen, each very creative in his own way in directing the Committee's activities.

Representative Overton Brooks was the Science and Astronautics Committee's first chairman, and was a tireless worker on the Committee's behalf for the two and one-half years he served as Chairman.

When Brooks convened the first meeting of the new committee in January of 1959, Committee Member Ken Hechler recalled, "There was a sense of destiny, a tingle of realization that every member was embarking on a voyage of discovery, to learn about the unknown, to point powerful telescopes toward the cosmos and unlock secrets of the universe, and to take part in a great experiment." With that spirit the Committee began its work.

Brooks worked to develop closer ties between the Congress and the scientific community. On February 2, 1959, opening the first official hearing of the new Committee, Chairman Brooks said, "Although perhaps the principal focus of the hearings for the next several days will be on astronautics, it is important to recognize that

¹Now named the National Institute of Standards and Technology (NIST) (P.L. 100-418, Title V, Part B, Subpart A, Sections 5111 through 5163, enacted August 23, 1988.)

this committee is concerned with scientific research across the board.” And so, from the beginning, the Committee was concerned with the scope of its vision.

Overton Brooks died of a heart attack in September of 1961, and the chairmanship of the Committee was assumed by Representative George Miller of California.

Miller, a civil engineer, was unique among Members of Congress who rarely come to the legislature with a technical or scientific background. He had a deep interest in science, and his influence was clearly apparent in the broadening of the charter of the National Science Foundation and the establishment of the Office of Technology Assessment. He pioneered in building strong relationships with leaders of science in other nations. This work developed the focus for a new subcommittee established during his chairmanship, known as the Subcommittee on Science, Research and Development.

Just a few months before Miller became Chairman, President John F. Kennedy announced to a joint session of Congress the national commitment to land a man on the Moon and return him safely to Earth before the end of the decade. Thus, during Miller’s 11-year tenure as Chairman, the Committee directed its main efforts toward the development of the space program.

Chairman Miller was not reelected in the election of 1972, so in January of 1973, Representative Olin E. Teague of Texas took over the helm of the Committee. Teague, a man of directness and determination, was a highly decorated hero of the second World War. He was a long-standing Member of Congress and Chairman of the Veterans Committee before assuming the chairmanship of the Science and Technology Committee.

Throughout the 1960’s and early 1970’s, Teague chaired the Science Committee’s Manned Space Flight Subcommittee, and in that capacity firmly directed the efforts to send a man to the Moon.

As Chairman of the Committee, Teague placed heavy emphasis on educating the Congress and the public on the practical value of space. He also prodded NASA to focus on the industrial and human applications of the space program.

One of Teague’s first decisions as Chairman was to set up a Subcommittee on Energy. During his six-year leadership of the Committee, energy research and development became a major part of the Committee’s responsibilities.

In 1976, Chairman Teague saw the fruition of three years of intensive committee work to establish a permanent presence for science in the White House. The Office of Science and Technology Policy was established with a director who would also serve as the President’s science advisor.

Throughout his leadership, he voiced constant concern that the complicated technical issues the Committee considered be expressed in clear and simple terms so that Members of Congress, as well as the general public, would understand the issues.

After six years as Chairman, Teague retired from the Committee and the Congress due to serious health problems and was succeeded as Chairman by Representative Don Fuqua of Florida.

Fuqua became Chairman on January 24, 1979, at the beginning of the 96th Congress.

Don Fuqua came to the Congress after two terms in the Florida State Legislature and was, at age 29, the youngest Democrat in Congress when he was elected in 1962.

Fuqua's experience on the Committee dated back to the first day of his Congressional service. Since 1963, he served as a Member of the Committee's Manned Space Flight Subcommittee. When Olin Teague became Chairman of the Full Committee in 1973, Fuqua took Teague's place as Chairman of the Subcommittee.

As the Subcommittee Chairman, he was responsible for major development decisions on the Space Shuttle and the successful Apollo-Soyuz link-up in space between American astronauts and Soviet cosmonauts. Later, the Subcommittee's responsibility was expanded to cover all other NASA activities and was renamed the Subcommittee on Space Science and Applications.

As Chairman of the Committee, Fuqua's leadership could be seen in the expansion of committee activities to include technological innovation, science and math education, materials policy, robotics, technical manpower, and nuclear waste disposal. He worked to strengthen the Committee's ties with the scientific and technical communities to assure that the Committee was kept abreast of current developments, and could better plan for the future.

During the 99th Congress, the Science and Technology Committee, under Fuqua's chairmanship, carried out two activities of special note.

- The Committee initiated a study of the Nation's science policy encompassing the 40-year period between the end of the second World War and the present. The intent was to identify strengths and weaknesses in our nation's science network. At the end of the 99th Congress, Chairman Fuqua issued a personal compilation of essays and recommendations on American science and science policy issues in the form of a Chairman's Report.
- The second activity was a direct outgrowth of the Space Shuttle "Challenger" accident of January 28, 1986. As part of the Committee's jurisdictional responsibility over all the NASA programs and policies, a steering group of Committee Members, headed by Ranking Minority Member Robert Roe, conducted an intensive investigation of the Shuttle accident. The Committee's purpose and responsibility were not only the specific concern for the safe and effective functioning of the Space Shuttle program, but the larger objective of insuring that NASA, as the Nation's civilian space agency, maintain organizational and programmatic excellence across the board.

Chairman Fuqua announced his retirement from the House of Representatives at the termination of the 99th Congress. He served 24 years on the Committee on Science and Technology and eight years as its Chairman.

Congressman Robert A. Roe of New Jersey, a long-time Member of the Committee, became its new Chairman at the beginning of the 100th Congress. Congressman Roe was trained as an engineer and brought that broad knowledge and understanding to bear on the Committee's issues from the first day of his tenure.

Congressman Roe's first official act as Chairman was to request a change in the Committee's name from the Committee on Science and Technology to the Committee on Science, Space, and Technology. This change was designed not only to reflect the Committee's broad space jurisdiction, but also to convey the importance of space exploration and development to the Nation's future.

In the 100th Congress, under Chairman Roe's stewardship, the Committee kept close scrutiny over NASA's efforts to redesign and reestablish the space shuttle program. The successful launch of the Shuttle Discovery in September, 1988 marked America's return to space after 32 months without launch capability.

The vulnerability of having the Nation's launch capability concentrated singularly in the Space Shuttle, and the rapid increase of foreign competition in commercial space activities, precipitated strong committee action to help ensure the competitive posture of the Nation's emerging commercial launch industry.

Chairman Roe's leadership to stabilize and direct the Nation's space program led to the Committee's first phase of multi-year authorizations for research and development programs with the advent of three-year funding levels for the Space Station.

Within the national movement to improve America's technological competitiveness, Chairman Roe headed the Committee's initiative to expand and redefine the mission of the National Bureau of Standards in order for it to aid American industry in meeting global technological challenges.

The Science Committee has a long tradition of alerting the Congress and the Nation to new scientific and technological opportunities that have the potential to create dramatic economic or societal change. Among these have been recombinant DNA research and supercomputer technology. In the 100th Congress, Members of the Committee included the new breakthroughs in superconductivity research in this category.

Several long-term efforts of the Committee came to fruition during the 101st Congress. As the community of space-faring nations expanded, and as space exploration and development moved toward potential commercialization in some areas, the need arose for legal certainty concerning intellectual property rights in space. Legislation long advocated by the Science Committee defining the ownership of inventions in outer space became public law during this Congress.

Continuing the Committee's interest in long-range research programs for renewable and alternative energy sources, a national hydrogen research and development program was established. The mission of the program was to foster the economic production of hydrogen from renewable resources to its use as an alternative fuel.

At the end of the 101st Congress, the House Democratic Caucus voted Representative Roe Chairman of the Public Works and Transportation Committee.

The hallmark of Representative Roe's four-year tenure as Chairman was his articulation of science, space, and technology as the well-spring for generating the new wealth for America's future economic growth and long-term security.

At the beginning of the 102nd Congress in January, 1991, Representative George E. Brown, Jr. of southern California became the sixth Chairman of the Science, Space, and Technology Committee.

Trained in industrial physics, Brown worked as a civil engineer for many years before entering politics.

Elected to the Congress in 1962, Brown was a Member of the Science, Space, and Technology Committee since 1965. During his more than two-decade tenure on the Committee before becoming its Chairman, he chaired subcommittees on the Environment, on Research and Technology, and on Transportation and Aviation R&D.

Whether from his insightful leadership as a Subcommittee Chairman or from the solitary summit of a futurist, Brown brought a visionary perspective to the Committee's dialogue by routinely presenting ideas far ahead of the mainstream agenda.

George Brown talked about conservation and renewable energy sources, technology transfer, sustainable development, environmental degradation, and an agency devoted to civilian technology when there were few listeners and fewer converts and he tenaciously stuck to those beliefs.

Consistent with his long-held conviction that the Nation needed a coherent technology policy, Brown's first action as Chairman was to create a separate subcommittee for technology and competitiveness issues. During his initial year as Chairman, Brown developed an extensive technology initiative which was endorsed by the House of Representatives in the final days of the 102nd Congress. The work articulated Brown's concept of a partnership between the public and private sectors to improve the Nation's competitiveness.

The culmination of the 102nd Congress saw Brown's persistent efforts to redirect our national energy agenda come to fruition. The first broad energy policy legislation enacted in over a decade included a strong focus on conservation, renewable energy sources, and the expanded use of non-petroleum fuels, especially in motor vehicles.

In Brown's continuing concern to demonstrate the practical application of advances in science and technology, he instituted the first international video-conferenced meetings in the U.S. Congress. In March of 1992, Members of the Science Committee exchanged ideas on science and technology via satellite with counterparts from the Commonwealth of Independent States. This pilot program in the House of Representatives resulted in a decision to establish permanent in-house capacity for video-conferencing for the House.

As a final activity in the 102nd Congress, Brown issued a Chairman's Report on the federally funded research enterprise. The work was intended as the starting point for a comprehensive review and revision of federal science policy currently in the planning stage.

The 1994 congressional elections turned over control of the Congress to the Republican Party. The House Republican Conference acted to change the official name of the Committee from the Committee on Science, Space, and Technology to the Committee on Science. Representative Robert S. Walker of Pennsylvania became the Science Committee's first Republican Chairman, and the seventh Committee Chairman. Walker had served on the Science Committee since his election to Congress in 1976, and had been its ranking minority member since 1989.

Chairman Walker acted to streamline the subcommittee structure from five to four subcommittees: Basic Research; Energy and Environment; Space and Aeronautics; and Technology. This action reflected the new Congress' mandate to increase efficiency and cut

expenses, and also reflected Walker's personal desire to refocus the Committee's work. Due to the reduction in the number of subcommittees and a sharper focus on the issues, the number of hearings was reduced, while the number of measures passed by the House and signed into law increased.

Chairman Walker chose to use the Full Committee venue to hold hearings exploring the role of science and technology in the future. The first hearing, *Is Today's Science Policy Preparing Us for the Future?*, served as the basis for much of the Committee's work during the 104th Congress.

For the first time in recent Science Committee history, the Committee and the House of Representatives passed authorizations for every agency under the Committee's jurisdiction. To preserve and enhance the core federal role of creating new knowledge for the future, the Science Committee sought to prioritize basic research policies. In order to do so, the Committee took strong, unprecedented action by applying six criteria to civilian R&D:

1. Federal R&D efforts should focus on long-term, non-commercial R&D, leaving economic feasibility and commercialization to the marketplace.
2. All R&D programs should be relevant and tightly focused to the agencies' missions.
3. Government-owned laboratories should confine their in-house research to areas in which their technical expertise and facilities have no peer and should contract out other research to industry, private research foundations and universities.
4. The Federal Government should not fund research in areas that are receiving, or should reasonably be expected to obtain, funding from the private sector.
5. Revolutionary ideas and pioneering capabilities that make possible the impossible should be pursued within controlled, performance-based funding levels.
6. Federal R&D funding should not be carried out beyond demonstration of technical feasibility. Significant additional private investment should be required for economic feasibility, commercial development, production and marketing.

The authorization bills produced by the Science Committee reflected those standards, thereby protecting basic research and emphasizing the importance of science as a national issue. As an indication of the Science Committee's growing influence, the recommendations and basic science programs were prioritized accordingly.

During the 104th Congress, the Science Committee's oversight efforts were focused on exploring ways to: make government more efficient; improve management of taxpayer resources; expose waste, fraud and abuse; and give the United States the technological edge into the 21st century.

The start of the 105th Congress brought another change in leadership to the Committee. Representative F. James Sensenbrenner, Jr., a Republican from Wisconsin, became the eighth Chairman after Chairman Walker retired from Congress. Sensenbrenner had been a Member of the Committee since 1981 and prior to his ap-

pointment as Committee head, he served as Chairman of the Subcommittee on Space and Aeronautics.

At the start of the 105th Congress, the Speaker of the House charged the Science Committee with the task of developing a long-range science and technology policy. Chairman Sensenbrenner appointed the Committee's Vice Chairman, Representative Vernon Ehlers of Michigan, to lead a study of the current state of the Nation's science and technology policy. The National Science Policy Study, *Unlocking Our Future: Toward A New National Science Policy*, was unveiled in September 1998 and was endorsed by the House on Oct. 8, 1998. The Science Policy Study continues to serve as a policy guide to the Committee, Congress and the scientific community.

The Science Committee played a crucial role in numerous issues of national and international significance during Chairman Sensenbrenner's tenure. Acting in accordance with the Committee's jurisdiction over climate change issues, Chairman Sensenbrenner was chosen by the Speaker of the House to lead the U.S. delegation to the Kyoto (December, 1997), Buenos Aires (November, 1998), and The Hague (November, 2000) global warming conferences. Under Chairman Sensenbrenner's leadership, the Committee examined the science supporting the Kyoto Protocol and the economic impacts the treaty could have on the Nation.

Much of the world anxiously awaited midnight of January 1, 2000 to see if the Year 2000 (Y2K) computer problem would cause the catastrophe that some had predicted. The Science Committee through the Subcommittee on Technology, chaired by Representative Constance Morella of Maryland, held its first hearing on the Y2K problem in 1996 and held or participated in over 30 hearings on the subject. The Committee's aggressive oversight pushed federal agencies to meet their deadlines to ensure the safety and well being of American citizens. Thankfully, the U.S. and the world experienced very minor problems associated with the Y2K rollover.

Over many years, and during the tenure of several chairmen, the Science Committee closely monitored development of the International Space Station. In October of 2000, a crew of American and Russian astronauts became the first inhabitants of the space station.

One of Chairman Sensenbrenner's priorities was to achieve a steady and sustained growth in federal R&D investments. During his tenure, funding for civilian federal R&D increased by 39 percent. Funding for the National Science Foundation increased 23 percent, including its highest ever appropriation in FY 2001.

The start of the 107th Congress brought another change in the Committee's leadership. Representative Sensenbrenner was elected Chairman of the Judiciary Committee and on January 3, 2001, Representative Sherwood L. Boehlert from New York became the new Chairman of the Committee on Science.

Boehlert had served on the Science Committee since first taking office in 1983 and had earned a reputation for independence, moderation and thoughtful leadership. In his first speech as Chairman, Boehlert pledged to "build the Science Committee into a significant force within the Congress," and "to ensure that we have a healthy, sustainable, and productive R&D establishment—one that educates students, increases human knowledge, strengthens U.S. competi-

tiveness and contributes to the well-being of the Nation and the world.”

With those goals in mind, Boehlert laid out three priorities for the Committee—“The Three E’s”—science and math education, energy policy, and the environment—three areas in which Boehlert believed the resources and expertise of the scientific enterprise could be brought to bear on issues of national significance.

Boehlert also reorganized the Subcommittees to reflect these new priorities. The four Subcommittees became Research; Energy; Environment, Technology, and Standards; and Space and Aeronautics.

Unexpected events in our nation’s history—the terrorist attacks of September 11, 2001 and the loss of the Space Shuttle *Columbia* on February 1, 2003—would also focus the Committee’s attention on preventing future terrorist attacks and charting a new course for human space exploration.

The Committee played a central role in the establishment of the new Department of Homeland Security (DHS), which represented the largest reorganization of the Federal Government since the creation of the Department of Defense in 1947. Because of the Committee’s tenacious efforts, the final legislation creating the new Department, signed into law on November 22, 2002, included a Science and Technology Directorate and a Homeland Security Advanced Research Projects Agency, the two entities within DHS tasked with putting our nation’s scientific ingenuity to work at protecting the American people.

Heeding Chairman Boehlert’s admonition that “the War on Terrorism, like the Cold War, will be won in the laboratory as much as on the battlefield,” the Science Committee also worked to ensure that agencies throughout the Federal Government were investing in the science and technology necessary to combat terrorism over the long-term.

One area of particular concern to Chairman Boehlert was the vulnerability of the Nation’s power grid, financial institutions and other critical infrastructures to a cyber attack. To strengthen our nation’s cyber security efforts, Boehlert authored the *Cyber Security Research and Development Act*, which was signed into law by President Bush on November 27, 2002.

Under Boehlert’s leadership, the Committee also took the lead in responding to the concerns of family members of September 11th victims regarding the investigation into the collapse of the World Trade Center. After two high-profile hearings into the matter, the Committee introduced legislation to enable the government to respond more quickly to building failures and to overcome the problems that plagued the World Trade Center investigation. The Committee’s legislation, signed into law on October 1, 2002, designated the National Institute of Standards and Technology as the lead agency for all future building failure investigations.

The Committee also held hearings on how to strike the proper balance between the need for openness to conduct research successfully and the need for secrecy to protect homeland security. The Committee was particularly concerned about the significant delay in the processing of student visas following 9/11 and worked closely with the Administration to streamline the application process and reduce wait times for foreign researchers.

In addition to its efforts to shape the Department of Homeland Security, the Committee also had several legislative victories in the areas of research and education policy. A signature piece of legislation from the 107th Congress, the *National Science Foundation Authorization Act*, was signed into law in December 2002, authorizing the doubling of the agency's budget over 10 years. The bill also gave additional focus to the National Science Foundation's (NSF's) education programs and set up a process for establishing priorities for large science projects.

Less than two months into the 108th Congress, the Space Shuttle *Columbia*, with her crew of seven, broke apart during re-entry into Earth's atmosphere. The Committee held several high profile hearings into the cause of the accident and exercised close oversight of the proceedings of the *Columbia* Accident Investigation Board (CAIB), the independent investigative body convened by the National Aeronautics and Space Administration (NASA) to determine the cause of the accident.

The *Columbia* accident prompted President George W. Bush to issue a new vision for NASA that calls for the return of humans to the Moon and future manned mission to Mars and beyond. Following the President's announcement, the Committee held hearings and numerous briefings to evaluate his exploration plan. Chairman Boehlert applauded the President for giving NASA a clear vision for the future, but also raised questions about the funding of the proposal and about its potential impact on NASA's work in Space and Earth Science and in aeronautics.

Determined to strike the proper balance between NASA's human exploration programs and its science and aeronautics programs, the Committee drafted an authorization bill for NASA that formally endorsed the President's exploration initiative, dubbed the *Vision for Space Exploration*, while also ensuring that NASA remains a multi-mission agency by requiring robust programs in Earth science, space science, and aeronautics. By an overwhelming vote of 383 to 15, the House of Representatives endorsed the Committee's blueprint for the future direction of NASA and, on December 30, 2005, the bill was signed into law.

President Bush also signed into law Science Committee bills that allowed NASA to adapt to the workforce challenges of the 21st Century and promoted the development of the emerging commercial human space flight industry. The *NASA Flexibility Act of 2004*, introduced by Chairman Boehlert, gave NASA new personnel tools to attract and retain a top-notch technical workforce. The *Commercial Space Launch Amendments Act of 2004*, introduced by Space and Aeronautics Subcommittee Chairman Dana Rohrabacher of California, established a regulatory regime within the Federal Aviation Administration to encourage the development of the commercial human space flight industry, while providing information to the public on the inherent risks in space tourism and limiting that risk, as appropriate.

Following the recommendation of reports on ocean policy, the Committee passed an "organic act" for the National Oceanic and Atmospheric Administration (NOAA) that would formally establish the agency in law and clearly define its role and responsibilities. The House passed the bill, which was introduced by Representative Vernon J. Ehlers of Michigan, the Chairman of the Subcommittee

on Environment, Technology, and Standards, in September 2006, but the legislative clock ran out before it could be enacted into law.

One of Chairman Boehlert's signature accomplishments in the 109th Congress was elevating the issue of U.S. economic competitiveness to the forefront of domestic policy discussions. He and Ranking Minority Member Bart Gordon of Tennessee were among those who requested the 2005 National Academy of Sciences report, *Rising Above the Gathering Storm*, which recommended increased investment in research and education.

On December 7, 2005, Chairman Boehlert, along with Representative Ehlers and Representative Frank Wolf of Virginia, hosted a day-long Innovation Summit at the Department of Commerce that brought together more than 50 chief executive officers and university presidents to discuss the Nation's economic challenges with top Administration officials, including the secretaries of Education, Energy, Commerce and Labor.

The Committee's efforts helped pave the way for President Bush's American Competitiveness Initiative (ACI), announced in the 2006 State of the Union Address. The ACI proposed doubling the budgets of NSF, the National Institute of Standards and Technology's laboratory programs, and the Department of Energy's Office of Science over 10 years.

The Committee also worked to establish a research regime to help promote the development of nanotechnology, which was estimated by the National Science Foundation to become a \$1 trillion industry within a decade. Recognizing the enormous economic potential of nanotechnology, Chairman Boehlert authored the *21st Century Nanotechnology Research and Development Act*, signed into law in December 2003, which authorized increased funding and established a coordinated interagency program to carry out nanotechnology research.

Recognizing that the full economic potential of nanotechnology will only be realized if the public fully accepts the technology, the Committee also held several hearings on the potential environmental, health, and safety implications of nanotechnology and pressed the Administration to devote a greater share of research and development funding to addressing these areas of concern.

Central to the Nation's ability to compete is its ability to meet its energy demands, and the Science Committee took an active role in promoting the development of alternative energy sources. The Committee authored key provisions in the *Energy Policy Act*, enacted in 2005, that authorized research in and development of clean, domestically produced renewable energy sources. Representative Bob Inglis of South Carolina, Chairman of the Subcommittee on Research, also introduced the *H-Prize Act*, which called for the establishment of a national prize competition to summon America's best and brightest minds to the challenge of developing the technical breakthroughs that would make hydrogen vehicles technically and economically practical.

In November 2006, the Democratic Party regained the majority of the House of Representatives. The Democratic Caucus agreed to change the name of the Committee from the Committee on Science to the Committee on Science and Technology. This was previously the name of the Committee from the 93rd to the 99th Congress. Representative Bart Gordon became the Chairman of the newly re-

named Committee at the start of the 110th Congress. Gordon had served as the Ranking Minority Member of the Committee since the 108th Congress.

One of Chairman Gordon's first acts was to reorder the subcommittee structure of the Committee. In the 110th Congress there were five subcommittees of the Committee on Science and Technology: Energy and Environment; Technology and Innovation; Research and Science Education; Space and Aeronautics; and, Investigations and Oversight. The renewal of the Investigations and Oversight Subcommittee after a 12-year absence reflected the new Congress' focus on ethics and oversight of federal programs.

Under Chairman Gordon's leadership, the Committee on Science and Technology embarked on an aggressive agenda for the 110th Congress. The Chairman's early focus was on implementation of the recommendations of the National Academy of Sciences from their report, *Rising Above the Gathering Storm*. This report, which was requested in 2005 by then Ranking Minority Member Gordon, outlined steps the Federal Government needed to take to ensure the competitiveness of America in the 21st Century. Included in these recommendations were calls for additional teacher training in the math and science fields, scholarships to math and science college students who pursue teaching careers, increased funding for research and development, and the creation of a high-risk high-reward energy research agency within the Department of Energy modeled after the Defense Advanced Research Projects Agency (DARPA) at the Department of Defense. These recommendations were translated into legislation by the Committee, and eventually became law in the form of the *America COMPETES Act* (The *America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act*).

Another early focus of the Committee was on the topic of energy. The Committee moved numerous bills during the first session of the 110th Congress, and these individual pieces were eventually incorporated into an omnibus energy bill entitled the *Energy Independence and Security Act of 2007* (EISA). The Committee's contributions to this law included legislation on research, development, and demonstration in the areas of biofuels, solar energy, marine energy, geothermal energy, carbon sequestration, and energy storage. EISA also contained stringent new efficiency standards and automobile fuel efficiency standards.

The Committee also devoted considerable energy into oversight and reauthorization of NASA. This culminated in a one year reauthorization of the agency. The NASA reauthorization mandated that the agency take no steps that would preclude flying the Space Shuttle past 2010 until after the new President had a chance to evaluate the status of the agency. In addition to the agency's base authorization levels, the bill authorizes an additional one billion dollars to accelerate development of the Crew Exploration Vehicle, which is the follow-on human space transportation system to the Space Shuttle. Finally, the 2008 authorization increases funding for aeronautics research at the agency.

During the 110th Congress the Committee also passed several other pieces of legislation. The *Methamphetamine Remediation Research Act of 2007* tasked EPA to develop new detection and remediation technologies and standards for cleanup contaminated meth-

amphetamine production sites. The *U.S. Fire Administration Reauthorization Act of 2008* reauthorized programs at the Administration and added programs focused on fires at the wild land-urban interface. Finally, the Committee passed the *National Sea Grant College Program Amendments Act of 2008*, in conjunction with the Natural Resources Committee. There were numerous other pieces of legislation which were enacted that the Committee had jurisdictional interests in, including: *Implementing Recommendations of the 9/11 Commission Act of 2007*; *National Defense Authorization Act for Fiscal Year 2008*; *Consolidated Natural Resources Act of 2008*; *Food, Conservation, and Energy Act of 2008*; *Higher Education Opportunity Act*; *Great Lakes Legacy Reauthorization Act of 2008*; and, *Duncan Hunter National Defense Authorization Act for Fiscal Year 2009*.

Chapter I—Legislative Activities of the Committee on Science and Technology

1.1—P.L. 110–53, IMPLEMENTING RECOMMENDATIONS OF THE 9/11 COMMISSION ACT OF 2007 (H.R. 1)

Background and Summary of Legislation

P.L. 110–53, *Implementing Recommendations of the 9/11 Commission Act of 2007*, is a wide-ranging law which provides for the implementation of outstanding recommendations of the National Commission on Terrorist Attacks Upon the United States (9/11 Commission). The Act requires scanning of all cargo containers bound for U.S. ports within five years and scanning of all cargo on passenger aircraft within three years. Among other things, the Act authorizes grants for inter-operability for first responders, provides for risk-based allocation of Homeland Security Grants, authorizes rail and mass transit security grants, strengthens information sharing with local law enforcement, and provides for disclosure of the overall intelligence budget.

Provisions of P.L. 110–53 on which the Committee was involved in conference include Sections: 1103, Interagency coordination to enhance defenses against nuclear and radiological weapons of mass destruction; 1408, Public transportation security research and development; 1518, Railroad security research and development; 1535, Over-the-road bus security research and development; 1608, Research and development of aviation transportation security technology; 1610, Protection of passenger planes from explosives; and 1901, Promoting anti-terrorism capabilities through international cooperation.

Legislative History

On January 5, 2007, Bennie Thompson, Chairman of the Committee on Homeland Security, introduced H.R. 1, which was referred to the Committees on Homeland Security, Energy and Commerce, Judiciary, Intelligence (Permanent Select), Foreign Affairs, Transportation and Infrastructure, Oversight and Government Reform, and Ways and Means. On January 9, 2007, H.R. 1 was considered by the House and passed by: Y–299, N–128 (Roll Call No. 15).

H.R. 1 was received in the Senate on January 9, 2007. On July 9, 2007, the Senate passed H.R. 1 by unanimous consent, after striking all after the enacting clause and inserting the text of S. 4, as amended. The Senate requested a conference and appointed conferees.

On July 17, 2007, the House disagreed with the Senate amendment to H.R. 1 and agreed to a conference. From the Committee on Science and Technology, the Speaker appointed the following

conferees for consideration of Sections 703, 1301, 1464, 1467, and 1507 of the Senate amendment, and modifications committed to conference: Chairman Bart Gordon, Technology and Innovation Subcommittee Chairman David Wu, and Technology and Innovation Subcommittee Ranking Minority Member Phil Gingrey.

On July 25, 2007, the conference report (H.Rept. 110–259) was filed. The Senate considered and passed the conference report on July 26, 2007, by: Y–85, N–8 (Record Vote No. 284). The House passed the conference report on July 27, 2007, by: Y–371, N–40 (Roll Call No. 757). It was signed into law by the President on August 3, 2007, and became Public Law No. 110–53.

1.2—P.L. 110–69, AMERICA COMPETES ACT (H.R. 2272)

Background and Summary of Legislation

P.L. 110–69, the *America COMPETES Act* or *America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act*, is a comprehensive bill aimed at enhancing the competitiveness of the United States by investing in math and science education, investing in basic research and development, and creating a new entity at the Department of Energy to engage in high-risk, high-reward energy research and technology development. Many of the provisions in P.L. 110–69 are based on recommendations made in the National Academies report, “*Rising Above the Gathering Storm*.”

The *America COMPETES Act* reauthorizes both the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST), and puts both of those entities on a near-term path to doubling in funding. The Department of Energy (DOE) Office of Science is also put on a near-term path to doubling in funding. In addition to increasing overall funding for basic research, the Act also expands early career grant programs and provides additional support for outstanding young investigators at both NSF and DOE.

Science, technology, engineering, and mathematics (STEM) education is another focus of the *America COMPETES Act*. The Act helps to prepare thousands of new STEM teachers and provides current teachers with content and teaching skills in their area of education through NSF’s Noyce Teacher Scholarship Program and Math and Science Partnerships Program. P.L. 110–69 also expands programs at NSF to enhance the undergraduate education of the future science and engineering workforce. Finally, the Act authorizes new grant programs to implement courses of study in STEM fields and foreign languages in ways that lead to baccalaureate degrees with concurrent teacher certification, and increase the number of AP and IB teachers serving in high-need schools.

The *America COMPETES Act* also establishes an Advanced Research Projects Agency for Energy (ARPA–E) at DOE. Based on the Department of Defense’s Defense Advanced Research Projects Agency (DARPA), ARPA–E is envisioned as a nimble and semi-autonomous research agency that engages in high-risk, high-reward energy research.

Finally, the Act makes investments in the Nation’s technology competitiveness by creating the Technology Innovation Program at

NIST to fund high-risk, high-reward, pre-competitive technology development with high potential for public benefit. In addition, the Act significantly updates the *High-Performance Computing Act of 1991*, meant to ensure the Nation's preeminence in advanced computing.

The *America COMPETES Act* ultimately included the substance of several smaller bills which were packaged together to create a comprehensive agenda on competitiveness. Those bills within the jurisdiction of the Committee on Science and Technology include: H.R. 362, *10,000 Teachers, 10 Million Minds Science and Math Scholarship Act*; H.R. 363, *Sowing the Seeds Through Science and Engineering Research Act*; H.R. 364, *To provide for the establishment of the Advanced Research Projects Agency Energy*; H.R. 524, *To establish a laboratory science pilot program at the National Science Foundation*; H.R. 1068, *To amend the High-Performance Computing Act of 1991*; H.R. 1231, *To enable the awarding of the Malcolm Baldrige National Quality Award to a greater number of qualified enterprises*; H.R. 1867, *National Science Foundation Authorization Act of 2007*; H.R. 1868, *Technology Innovation and Manufacturing Stimulation Act of 2007*; and, H.R. 2153, *21st Century Competitiveness Act of 2007*.

Legislative History

On May 10, 2007, Chairman Bart Gordon introduced H.R. 2272, which was referred solely to the Committee on Science and Technology. H.R. 2272 was comprised of five bills previously considered by both the Committee on Science and Technology and the House: H.R. 362, H.R. 363, H.R. 1068, H.R. 1867, and H.R. 1868. On May 21, 2007 the House considered H.R. 2272 under suspension of the rules, and agreed to the bill by voice vote.

The bill was received in the Senate on May 22, 2007. On July 19, 2007, the Senate passed H.R. 2272 by unanimous consent, after striking all after the enacting clause and inserting the text of S. 761, as amended. The Senate requested a conference and appointed conferees. The Senate amendment to H.R. 2272 contained provisions analogous to H.R. 364 and H.R. 2153.

On July 31, 2007, the House disagreed with the Senate amendment to H.R. 2272 and agreed to a conference. From the Committee on Science and Technology, the Speaker appointed the following conferees: Chairman Bart Gordon, Vice Chair Dan Lipinski, Research and Science Education Subcommittee Chairman Brian Baird, Technology and Innovation Subcommittee Chairman David Wu, Energy and Environment Subcommittee Chairman Nick Lampson, Space and Aeronautics Subcommittee Chairman Mark Udall, Gabrielle Giffords, Jerry McNerney, Ranking Minority Member Ralph Hall, Investigations and Oversight Subcommittee Ranking Minority Member Jim Sensenbrenner, Research and Science Education Ranking Minority Member Vernon Ehlers, Judy Biggert, Space and Aeronautics Subcommittee Ranking Minority Member Tom Feeney, and Technology and Innovation Subcommittee Ranking Minority Member Phil Gingrey.

The Conferees met on July 31, 2007 and reached agreement. On August 1, 2007, the conference report (H.Rept. 110-289) was filed. The conference report passed the House on August 2, 2007, by: Y-

367, N-57 (Roll Call No. 802). On August 2, 2007, the Senate agreed to the conference report by unanimous consent. It was signed into law by the President on August 9, 2007, and became Public Law No: 110-69.

1.3—P.L. 110-140, ENERGY INDEPENDENCE AND SECURITY ACT OF 2007 (H.R. 6)

Background and Summary of Legislation

The *Energy Independence and Security Act of 2007*, P.L. 110-140, is a comprehensive energy policy law. The purpose of the bill, and the full title of the bill, is, “To move the United States toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and vehicles, to promote research on and deploy greenhouse gas capture and storage options, and to improve the energy performance of the Federal Government.” The House version of the bill, H.R. 3221, was referred to ten House committees upon introduction. The Science and Technology Committee has jurisdiction over those parts of the bill dealing with energy research, development, demonstration, and commercial applications, climate and marine research, and transportation research and development.

P.L. 110-140 incorporates the substance of nine bills which originated with the Committee on Science and Technology: H.R. 632, *H-Prize Act of 2007*; H.R. 1933, *Department of Energy Carbon Capture and Storage Research, Development, and Demonstration Act of 2007*; H.R. 2229, *United States-Israel Energy Cooperation Act*; H.R. 2304, *Advanced Geothermal Energy Research and Development Act of 2007*; H.R. 2313, *Marine Renewable Energy Research and Development Act of 2007*; H.R. 2773, *Biofuels Research and Development Enhancement Act*; H.R. 2774, *Solar Energy Research and Advancement Act of 2007*; H.R. 3775, *Industrial Energy Efficiency Research and Development Act of 2007*; and, H.R. 3776, *Energy Storage Technology Advancement Act of 2007*. Four additional bills which are included in P.L. 110-140 were referred to the Committee on Science and Technology: H.R. 2337, *Energy Policy Reform and Revitalization Act of 2007*; H.R. 3237, *Smart Grid Facilitation Act of 2007*; H.R. 3238, *To promote the development of renewable fuels infrastructure, and for other purposes*; and, H.R. 3239, *To promote advanced plug-in hybrid vehicles and vehicle components*. Three more bills included in P.L. 110-140 were not referred to the Committee, but were recognized as being in the Committee’s jurisdiction during informal conferencing: H.R. 2420, *International Climate Cooperation Re-engagement Act of 2007*; H.R. 2701, *Transportation Energy Security and Climate Change Mitigation Act of 2007*; and, H.R. 3236, *Energy Efficiency Improvement Act of 2007*.

Legislative History

On January 12, 2007, Natural Resources Chairman Nick Rahall introduced H.R. 6, which was then titled the, “CLEAN Energy Act of 2007.” This bill, which is dramatically different than the final enacted version of H.R. 6, passed the House on January 18, 2007, by: Y-264, N-163 (Roll Call No. 40).

H.R. 6 was received in the Senate on January 18, 2007. On June 21, 2007, the Senate passed H.R. 6 with an amendment by: Y-65, N-27, (Record Vote No. 226). The Senate amendment to H.R. 6 re-titled the bill the, “Renewable Fuels, Consumer Protection, and Energy Efficiency Act of 2007,” and greatly changed the focus and scope of the legislation.

On July 30, 2007, House Speaker Nancy Pelosi introduced H.R. 3221, the *New Direction for Energy Independence, National Security, and Consumer Protection Act*. H.R. 3221 was referred upon introduction to the Committee on Energy and Commerce, and in addition to the Committees on Education and Labor, Foreign Affairs, Small Business, Science and Technology, Agriculture, Oversight and Government Reform, Natural Resources, Transportation and Infrastructure, and Armed Services. H.R. 3221 was comprised of the substance of the following individual bills which had been previously introduced: H.R. 2304, *Advanced Geothermal Energy Research and Development Act of 2007*; H.R. 2773, *Biofuels Research and Development Enhancement Act*; H.R. 3101, *Biomass Research and Development Act of 2007*; H.R. 2635, *Carbon-Neutral Government Act of 2007*; H.R. 1933, *Department of Energy Carbon Capture and Storage Research, Development, and Demonstration Act of 2007*; H.R. 3236, *Energy Efficiency Improvement Act of 2007*; H.R. 2337, *Energy Policy Reform and Revitalization Act of 2007*; H.R. 906, *Global Change Research and Data Management Act of 2007*; H.R. 2338, *Global Warming Wildlife Survival Act*; H.R. 2847, *Green Jobs Act of 2007*; H.R. 2420, *International Climate Cooperation Re-engagement Act of 2007*; H.R. 2313, *Marine Renewable Energy Research and Development Act of 2007*; H.R. 1267, *National Carbon Dioxide Storage Capacity Assessment Act of 2007*; H.R. 2342, *National Integrated Coastal and Ocean Observation Act of 2007*; S. 2314, *Royalty Relief for American Consumers Act of 2007*; H.R. 2389, *Small Energy Efficient Businesses Act*; H.R. 3237, *Smart Grid Facilitation Act of 2007*; H.R. 2774, *Solar Energy Research and Advancement Act of 2007*; H.R. 3238, *To promote the development of renewable fuels infrastructure, and for other purposes*; H.R. 3239, *To promote advanced plug-in hybrid vehicles and vehicle components*; H.R. 2701, *Transportation Energy Security and Climate Change Mitigation Act of 2007*; H.R. 1838, *United States-Israel Energy Cooperation Act*. On August 4, 2007, the House passed H.R. 3221, as amended, by: Y-241, N-172 (Roll Call No. 832). On September 4, 2007, H.R. 3221 was received in the Senate.

Subsequent to the House passing H.R. 3221, negotiations between the House and Senate commenced to reconcile the differences between the House passed version of H.R. 3221 and the Senate passed version of H.R. 6. On December 6, 2007, the House agreed with amendments to the Senate amendments to H.R. 6 by: Y-235, N-181 (Roll Call No. 1140). H.R. 6, as amended, was received by the Senate on December 7, 2007. On December 13, 2007, the Senate concurred in the House amendment to the Senate amendment to the text of H.R. 6, with an amendment by: Y-86, N-8 (Record Vote No. 430). H.R. 6, as amended, was transmitted to the House on December 14, 2007. On December 18, 2007, the House agreed to the Senate amendment to the House amendments to the Senate amendments by: Y-314, N-100 (Roll Call No. 1177).

It was signed into law by the President on December 18, 2007, and became Public Law No: 110–140.

1.4—P.L. 110–143, METHAMPHETAMINE REMEDIATION RESEARCH ACT OF 2007 (H.R. 365)

Background and Summary of Legislation

The *Methamphetamine Remediation Research Act of 2007*, P.L. 110–143, establishes a federal research program to support the development of voluntary guidelines to help states address the residual consequences of former methamphetamine laboratories. The Act requires the Administrator at the Environmental Protection Agency (EPA) to establish a program of research on residues from the production of methamphetamines. The Act further requires the Administrator, in consultation with the National Institute for Standards and Technology, to establish voluntary guidelines for preliminary site assessment and remediation of methamphetamine laboratories. P.L. 110–143 requires the Administrator to convene a meeting of relevant State agencies, individuals, and organizations to share best practices and identify research needs. It also requires the EPA to enter into an arrangement with the National Academy of Sciences to study the status and quality of research on the residual effects of meth labs, identify research gaps, and recommend an agenda for EPA's research program. Finally, the Act authorizes appropriations for the fiscal years 2007 and 2008 for methamphetamine remediation related programs at EPA and NIST.

Legislative History

On February 15, 2005, Representatives Bart Gordon, Ken Calvert and Sherwood Boehlert introduced H.R. 798, the *Methamphetamine Remediation Research Act of 2005*. The bill was referred to the Committee on Science, which referred it to the Subcommittee on Environment, Technology, and Standards. On March 3, 2005, the Committee on Science held a hearing to examine the clean-up and remediation challenges of residential methamphetamine laboratories and to discuss H.R. 798. On March 15, 2005, the Subcommittee on Environment, Technology, and Standards held a markup. No amendments were offered. The measure was ordered reported by a voice vote. On March 17, 2005, the Full Committee held a markup. Mr. Gordon offered a substitute amendment, which made technical, clarifying and conforming changes to the underlying bill, which was adopted by voice vote. The measure was ordered reported, as amended, by a voice vote. On April 13, 2005, H.R. 798 was reported to the House and placed on the Union Calendar, Calendar No. 23. On December 13, 2005, the bill was considered and passed under suspension of the rules. On December 14, 2005, the Senate received the bill and referred it to the Committee on Environment and Public Works. On December 9, 2006, the Committee discharged the bill by unanimous consent. The Senate considered the bill and made an amendment to it by unanimous consent. The Senate passed the bill, as amended, and sent it back to the House for consideration. No further action was taken in the 109th Congress.

On January 10, 2007, Representative Bart Gordon introduced H.R. 365, the *Methamphetamine Remediation Research Act of 2007*. The bill reflected the changes the Senate had made to H.R. 798 in the 109th Congress. The bill was referred to the Committee on Science and Technology. On January 24, 2007, the Committee held a markup, and ordered the bill reported by a voice vote. On February 7, 2007, the Committee favorably reported the bill to the House and it was placed on the Union Calendar, Calendar No. 3. That same day the bill was considered under suspension of the rules and agreed to by: Y-426, N-2 (Roll Call No. 78). On February 8, 2007, the Senate received H.R. 365, and referred the bill to the Committee on Environment and Public Works. On December 11, 2007, the Committee on Environment and Public Works discharged the bill by unanimous consent. On December 11, 2007, the Senate passed the bill without amendment by unanimous consent. On December 13, 2007, the President signed H.R. 365, which became Public Law No. 110-143.

1.5—P.L. 110-181, NATIONAL DEFENSE AUTHORIZATION
ACT FOR FISCAL YEAR 2008 (H.R. 4986)

Background and Summary of Legislation

The *National Defense Authorization Act for Fiscal Year 2008* re-authorizes activities of the Department of Defense and national security activities of the Department of Energy for fiscal year 2008. In addition, certain wartime appropriations are authorized for fiscal year 2008.

Science and Technology Committee Members served as conferees for Section 801, as enacted. Section 801, Internal Controls for Procurements on Behalf of the Department of Defense by Certain Non-Defense Agencies, places certain limitations on procurements by non-defense agencies for the Department of Defense which are not in compliance with Department of Defense procurement requirements. The National Aeronautics and Space Administration (NASA) is one of the covered non-defense agencies under this section. In addition, Section 801 calls for Inspectors General reviews of procurement policies, procedures, and internal controls of covered non-defense agencies and periodic determinations if those non-defense agencies' procurement policies are in compliance with Department of Defense procurement requirements.

Legislative History

On March 20, 2007, Armed Services Committee Chairman Ike Skelton introduced H.R. 1585, the *National Defense Authorization Act for Fiscal Year 2008*. H.R. 1585 was favorably reported from the Committee on Armed Services, with an amendment, on May 11, 2007 (H.Rept. 110-146). H.R. 1585, as amended, was considered under a rule on May 16 and 17, 2007, and passed the House on May 17 by a recorded vote: Y-397, N-27 (Roll Call No. 373).

H.R. 1585 was received by the Senate on June 4, 2007, and on June 5, 2007, was placed on the Senate Legislative Calendar. On October 1, 2007, the Senate passed H.R. 1585 with an amendment by: Y-92, N-3 (Record Vote No.: 359). The Senate insisted on its

amendment, requested a conference and appointed Senate conferees on October 1, 2007.

On December 5, 2007, the House disagreed to the Senate amendment to H.R. 1585, agreed to go to conference, and appointed House conferees by unanimous consent.

From the Committee on Science and Technology, the Speaker appointed the following conferees for consideration of Sections 846, 1085, and 1088 of the Senate amendment, and modifications committed to conference: Chairman Bart Gordon, Gabrielle Giffords, and Research and Science Education Subcommittee Ranking Minority Member Vernon Ehlers. The Conferees met and reached agreement and on December 6, 2007, the conference report (H.Rept. 110-477) was filed. The conference report passed the House on December 12, 2007, by: Y-370, N-49 (Roll Call No. 1151). On December 14, 2007, the Senate agreed to the conference report by: Y-90, N-2 (Record Vote No. 433). On December 28, 2007, the President vetoed H.R. 1585.

On January 16, 2008, Armed Services Committee Chairman Ike Skelton introduced H.R. 4986, the National Defense Authorization Act for Fiscal Year 2008. H.R. 4986 was almost identical to H.R. 1585 as passed by the House and Senate, and Section 801 remained unchanged. On January 16, 2008, H.R. 4986 was considered and passed the House under suspension of the rules by: Y-369, N-46 (Roll Call No. 11). On January 22, 2008, H.R. 4968 was received in the Senate, considered, and passed without amendment by: Y-91, N-3 (Record Vote No. 1). On January 28, 2008, H.R. 4968 was signed into law by the President and became Public Law Number 110-181.

1.6—P.L. 110-229, CONSOLIDATED NATURAL RESOURCES ACT OF 2008 (S. 2739)

Background and Summary of Legislation

The *Consolidated Natural Resources Act of 2008* is an amalgamation of scores of smaller bills, most of which deal with public lands. The smaller bills were compiled into S. 2739 in order to more easily move them past procedural holds in the Senate. The following bills, or some portion of them, are included in S. 2739: H.Con.Res. 116, H.Con.Res. 209, H.R. 30, H.R. 85, H.R. 161, H.R. 235, H.R. 247, H.R. 276, H.R. 299, H.R. 319, H.R. 359, H.R. 376, H.R. 386, H.R. 407, H.R. 442, H.R. 467, H.R. 482, H.R. 495, H.R. 497, H.R. 512, H.R. 658, H.R. 713, H.R. 759, H.R. 761, H.R. 807, H.R. 815, H.R. 830, H.R. 839, H.R. 886, H.R. 902, H.R. 986, H.R. 1021, H.R. 1025, H.R. 1047, H.R. 1083, H.R. 1100, H.R. 1114, H.R. 1126, H.R. 1191, H.R. 1239, H.R. 1337, H.R. 1388, H.R. 1462, H.R. 1483, H.R. 1520, H.R. 1526, H.R. 1625, H.R. 1662, H.R. 1736, H.R. 1815, H.R. 1835, H.R. 1904, H.R. 1922, H.R. 2094, H.R. 2251, H.R. 2705, H.R. 3079, H.R. 3616, S.Con.Res. 6, S. 175, S. 200, S. 220, S. 235, S. 241, S. 255, S. 257, S. 263, S. 264, S. 265, S. 266, S. 289, S. 312, S. 327, S. 471, S. 488, S. 500, S. 512, S. 520, S. 553, S. 752, S. 797, S. 800, S. 817, S. 867, S. 890, S. 916, S. 955, S. 1039, S. 1110, S. 1112, S. 1116, S. 1143, S. 1148, S. 1184, S. 1258, S. 1329, S. 1475, S. 1608, S. 1634, S. 1709, S. 1808, S. 1941, S. 1991.

Two of the bills included in S. 2739 are bills which originated in the Committee on Science and Technology: H.R. 85 and H.R. 1126. H.R. 85, the *Energy Technology Transfer Act*, establishes Advanced Energy Technology Transfer Centers to facilitate in the dissemination of advanced energy technologies. H.R. 1126, *To reauthorize the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988*, reauthorizes the title program for FY 2008–FY 2012.

Legislative History

On March 10, 2008, Energy and Natural Resources Committee Chairman Jeff Bingaman introduced S. 2739, which was placed on the Senate Legislative Calendar. On April 10, 2008, S. 2739 passed the Senate with amendment by: Y–91, N–4 (Record Vote No. 101). S. 2739 was received in the House on April 10, 2008, and held at the desk. On April 29, 2008, S. 2739 was considered and passed under suspension of the rules by: Y–291, N–117 (Roll Call No. 226). The President signed S. 2739 on May 8, 2008, and it subsequently became Public Law 110–229.

1.7—P.L. 110–234, FOOD, CONSERVATION, AND ENERGY ACT OF 2008 (H.R. 2419)

Background and Summary of Legislation

The *Food, Conservation, and Energy Act of 2008*, or as it is commonly referred to, the Farm Bill, reauthorizes various programs related to agriculture. Specifically, the Act expands nutrition and food aid programs, expands food lunch programs, restructures and reauthorizes farm aid programs, expands conservation programs, reauthorizes research programs at the Department of Agriculture, and expands bio-energy programs at the Department of Agriculture.

The Committee on Science and Technology has jurisdiction over three sections of the public law: Section 4403, Joint nutrition monitoring and related research activities; Section 7529, Agricultural and rural transportation research and education; and, Section 9001, Energy. The Committee on Science and Technology has a long history of interest in joint nutrition monitoring and research, which is a joint effort between the Department of Agriculture and Health and Humans Services to continuously collect nutrition, diet, and health information, and analyze that data as it is collected. Section 7529 establishes a joint program between the Department of Agriculture and the Department of Transportation to carry out a competitive grant program for institutions of higher education to carry out agricultural and rural transportation research and education activities. Finally, Section 9001 amends the *Farm Security and Rural Investment Act of 2002* (the “Farm Bill” of 2002) with a comprehensive energy title. Included in this title are biomass research and development and biorefinery assistance programs.

Legislative History

On May 22, 2007, Agriculture Committee Chairman Collin Peterson introduced H.R. 2419, *Food, Conservation, and Energy Act of 2008*, which was referred to the Committee on Agriculture, and in

addition to the Committee on Foreign Affairs. On July 23, 2007, the Committee on Agriculture favorably reported H.R. 2419, with an amendment (H.Rept. 110–256). On July 23, 2007, the Committee on Foreign Affairs was discharged from further consideration of H.R. 2419. H.R. 2419, as amended, was considered under a rule on July 26 and 27, 2007, and passed the House on July 27, 2007, by: Y–231, N–191 (Roll Call No. 756).

H.R. 2419 was received in the Senate on September 4, 2007. The Farm Bill was considered by the Senate on November 8, 13, 14, 15, and 16 and December 5, 7, 10, 11, 12, 13, and 14, 2007. On December 14, 2007, the Senate passed H.R. 2419, with an amendment, by: Y–79, N–14 (Record Vote No. 434). The Senate insisted on its amendment, requested a conference, and appointed conferees for H.R. 2419.

On April 9, 2008, the House disagreed to the Senate amendment and agreed to a conference with the Senate by voice vote. From the Committee on Science and Technology, the Speaker appointed the following conferees for consideration of Sections 4403, 9003, 9006, 9010, 9015, 9019, and 9020 of the House bill, and Sections 7039, 7051, 7315, 7501, and 9001 of the Senate amendment, and modifications committed to conference: Chairman Bart Gordon, Energy and Environment Subcommittee Chairman Nick Lampson, and Michael McCaul. The conference met in late April and early May, and the conference report was agreed to and filed on May 13, 2008 (H.Rept. 110–627). On May 14, 2008, the House agreed to the conference report by a recorded vote of: Y–318, N–106 (Roll Call No. 315). On May 15, 2008, the Senate agreed to the conference report by: Y–81, N–15. The President vetoed H.R. 2419 on May 21, 2008. On May 21, 2008, the House voted to pass H.R. 2419, the objections of the President to the contrary, notwithstanding by the Yeas and Nays: Y–316, N–108 (Roll Call No. 346). On May 22, 2008, the Senate passed H.R. 2419 over the Presidential veto by: Y–82, N–13 (Record Vote No. 140). H.R. 2419 became Public Law No. 110–234.

Upon initial passage of H.R. 2419, it was discovered that due to a clerical error, one of the fifteen titles of the bill had not been delivered to the President. Therefore, only fourteen of the original fifteen titles of H.R. 2419 became law with the passage of H.R. 2419.

1.8—P.L. 110–246, FOOD, CONSERVATION, AND ENERGY ACT OF 2008 (H.R. 6124)

Background and Summary of Legislation

H.R. 6124, the *Food, Conservation, and Energy Act of 2008*, is virtually identical to the conference report for H.R. 2419, the *Food, Conservation, and Energy Act of 2008*. Due to a clerical error, only fourteen of the fifteen titles of H.R. 2419 were actually enacted into law (P.L. 110–234). Congresses' solution to this error was to pass the entire Farm Bill again, in the form of H.R. 6124, to ensure all fifteen titles became law.

Legislative History

On May 22, 2008, the Chairman of the Committee on Agriculture, Collin Peterson, introduced H.R. 6124, which was referred

to the Committee on Agriculture, and in addition to the Committee on Foreign Affairs. The House considered and passed H.R. 6124 on May 22, 2008, under suspension of the rules by the Yeas and Nays: Y-306, N-110 (Roll Call No. 353).

The Senate received H.R. 6124 on May 22, 2008. On June 5, 2008, the Senate passed H.R. 6124 by: Y-77, N-15 (Record Vote No. 144). On June 18, 2008, H.R. 6124 was vetoed by the President. On June 18, 2008, the House voted to pass H.R. 6124, the objections of the President to the contrary, notwithstanding by the Yeas and Nays: Y-317, N-109 (Roll Call No. 417). On June 18, 2008, the Senate passed H.R. 6124 over the Presidential veto by: Y-80, N-14 (Record Vote No. 151). H.R. 6124 became Public Law No. 110-246.

1.9—P.L. 110-315, HIGHER EDUCATION OPPORTUNITY ACT (H.R. 4137)

Background and Summary of Legislation

The *Higher Education Opportunity Act* is a comprehensive reauthorization and expansion of programs related to higher education. Much of the Act amends the *Higher Education Act of 1965* (P.L. 89-329). The last comprehensive reauthorization of the Higher Education Act occurred in 1998, under the *Higher Education Amendments of 1998* (P.L. 105-244). P.L. 110-315 authorizes a broad array of federal student aid programs. These include federal student aid programs under Title IV—Student Assistance, assistance for students pursuing international education under Title VI—International Education Programs, and programs for students seeking graduate and professional degrees under Title VII—Graduate and Post-secondary Improvement Programs. The Act also provides aid to institutions of higher education. This includes programs under Title II—Teacher Quality Enhancement, Title III—Strengthening Institutions, and Title V—Developing Institutions.

The Committee on Science and Technology has jurisdiction over Title IX, Part G—Minority Serving Institution Digital and Wireless Technology Opportunity Program. Section 971 of Part G amends the *Stevenson-Wydler Technology Innovation Act of 1980* to establish a program that award grants, cooperative agreements, and contracts to eligible minority serving institutions to aid the institutions in acquiring and enhancing the institutions' digital and wireless networking technologies. Section 972 authorizes appropriations for this program.

Legislative History

On November 9, 2007, Education and Labor Committee Chairman George Miller introduced H.R. 4137, which was referred to the Committee on Education and Labor, and in additions to the Committees on the Judiciary, Science and Technology, and Financial Services. The Committee on Education and Labor favorably reported H.R. 4137, with an amendment, on December 19, 2007 (H.Rept. 110-500). The Committees on the Judiciary, Science and Technology, and Financial Services were discharged from further consideration of H.R. 4137 on December 19, 2007. Prior to being discharged, Chairman Miller and Chairman Gordon exchanged let-

ters acknowledging the Committee on Science and Technology's jurisdiction over H.R. 4137. On February 7, 2008, the House considered H.R. 4137 under a rule, and the bill passed by the Yeas and Nays: Y-354, N-58 (Roll Call No. 40).

H.R. 4137 was received in the Senate on February 25, 2008, and referred to the Committee on Health, Education, Labor, and Pensions. The Committee on Health, Education, Labor, and Pensions was discharged of further consideration of H.R. 4137 by unanimous consent on July 29, 2008. On July 29, 2008, the Senate passed H.R. 4137, with an amendment, by unanimous consent, and the Senate insisted on its amendment, requested a conference, and appointed conferees.

On July 29, 2008, the House disagreed with the Senate amendment to H.R. 4137 and agreed to a conference by unanimous consent. From the Committee on Science and Technology the Speaker appointed the following conferees for consideration of Sections 961 and 962 of the House bill and Section 804 of the Senate amendment, and modifications committed to conference: Chairman Bart Gordon, Chairman of the Research and Science Education Subcommittee Brian Baird, and Randy Neugebauer. The conferees met on July 29, 2008, and agreed to the conference report, which was filed on July 30, 2008 (H.Rept. 110-803). The House agreed to the conference report on July 31, 2008, by the Yeas and Nays: Y-380, N-49 (Roll Call No. 544). The Senate agreed to the conference report on July 31, 2008, by: Y-83, N-8 (Record Vote No. 194). On August 14, 2008, the President signed H.R. 4137, and it became Public Law 110-315.

1.10—P.L. 110-365, GREAT LAKES LEGACY REAUTHORIZATION ACT OF 2008 (H.R. 6460)

Background and Summary of Legislation

The *Great Lakes Legacy Reauthorization Act of 2008* amends the *Federal Water Pollution Control Act* (commonly referred to as the Clean Water Act) to update and reauthorize the *Great Lakes Legacy Act of 2002* (P.L. 107-303). The Act authorizes appropriations for this program through fiscal year 2013. In addition, the Act limits the amount of appropriated funds that may be used for site characterization. The program is modified by the Act to add aquatic habitat restoration to the list of authorized activities the Great Lakes National Program Office is authorized to implement. The Act also revises the provision concerning the nonfederal share of projects costs, and changes other aspects of the program related to non-federal sponsors.

Legislative History

On July 10, 2008, Research and Science Education Subcommittee Ranking Member Vernon Ehlers introduced H.R. 6460, which was referred to the Committee on Transportation and Infrastructure, and in addition to the Committee on Science and Technology. The Committee on Transportation and Infrastructure favorably reported H.R. 6460 on September 15, 2008 (H.Rept. 110-849). After an exchange of letters acknowledging jurisdiction of the Committee on Science and Technology over the bill, the Committee on Science

and Technology was discharged of H.R. 6460 on September 15, 2008. On September 18, 2008, the House considered and passed H.R. 6460 under suspension of the rules by: Y-371, N-20 (Roll Call No. 615).

H.R. 6460 was received in the Senate on September 22, 2008, and on September 25, 2008, the Senate passed the bill, with an amendment, by unanimous consent. On September 27, 2008, the House considered H.R. 6460, with a Senate amendment, under suspension of the rules, and on September 28, 2008, the bill passed by: Y-411, N-9 (Roll Call No. 665). On October 8, 2008, the President signed H.R. 6460, and it became Public Law 110-365.

1.11—110-376, UNITED STATES FIRE ADMINISTRATION REAUTHORIZATION ACT OF 2008 (S. 2606)

Background and Summary of Legislation

The *United States Fire Administration Reauthorization Act of 2008* amends the *Federal Fire Prevention and Control Act of 1974* to authorize appropriations for the U.S. Fire Administration through 2012. The Act also authorizes a number of changes to programs at the United States Fire Administration (USFA). This includes authorizing the Superintendent of the National Academy for Fire Prevention and Control to include several new topics for fire service personnel training. The Act also increases the percentage of authorized USFA appropriations that may be used for assistance of State and local fire service training programs. In addition, the Act authorizes the Superintendent to conduct on-site training programs, and authorizes the USFA Administrator to contract with outside organizations to conduct on-site training programs. Section 5 of the Act directs the USFA Administrator to update the National Fire Incident Reporting System to allow real-time, web-based reporting. The Act authorizes the USFA Administrator to coordinate with the Secretary of Agriculture, the Secretary of the Interior, and the Wildland Fire Leadership Council in assisting the Nation's fire service in rural and remote areas and to improve fire prevention and control in the wildland-urban interface. Additionally, the Act requires the USFA Administrator to promote the adoption of voluntary national consensus standards for firefighter health and safety by the Nation's fire services. The Act requires the USFA Administrator to include emergency medical services (EMS) in his liaison and coordination activities across the Federal Government, and authorizes the Administrator to conduct studies of the operating and management aspects of fire based EMS. Finally, the Act directs the Secretary of Homeland Security to establish a fire service position at the National Operations Center.

Legislative History

On December 19, 2007, Harry Mitchell introduced H.R. 4847, the *United States Fire Administration Reauthorization Act of 2008*, which was referred to the Committee on Science and Technology. On February 7, 2008, the Subcommittee on Technology and Innovation marked up H.R. 4847, and favorably reported the amended bill to the Full Committee. On February, 27, 2008, the Committee on Science and Technology held a markup on H.R. 4847. The bill was

amended and ordered reported by voice vote. On March 31, 2008, the Committee on Science and Technology reported H.R. 4847, with an amendment (H.Rept. 110–559). On April 3, 2008, the House considered H.R. 4847 under a rule, and the bill passed by the Yeas and Nays: Y–412, N–0 (Roll Call No. 160). H.R. 4847 was received in the Senate on April 4, 2008. No other action was taken on H.R. 4847.

On February 7, 2008, Christopher Dodd introduced S. 2606, the *United States Fire Administration Reauthorization Act of 2008*, which was referred to the Committee on Homeland Security and Governmental Affairs. Senate committee staff and staff from the Committee on Science and Technology engaged in discussions aimed at reconciling S. 2606 and H.R. 4847, as passed the House. These discussions continued after the Committee on Homeland Security and Governmental Affairs reported S. 2606 out with an amendment in the nature of a substitute on July 10, 2008 (Report No. 110–411). On September 18, 2008, the Senate passed S. 2606, with an amendment, by unanimous consent.

On September 24, 2008, the House considered S. 2606 under suspension of the rules, and the bill passed by the Yeas and Nays: Y–418, N–2 (Roll Call No. 636). On October 8, 2008, the President signed S. 2606, and it became Public Law 110–376.

1.12—P.L. 110–394, NATIONAL SEA GRANT COLLEGE PROGRAM AMENDMENTS ACT OF 2008 (H.R. 5618)

Background and Summary of Legislation

The *National Sea Grant College Amendments Act of 2008* amends the National Sea Grant College Program to reauthorize the program through fiscal year 2014, and make a number of other changes to the program. The Act adds regional and national projects as elements of the national sea grant college program in Section 5, and also revises the program director’s duties. The Act also requires that sea grant colleges provide extension services. Section 8 of P.L. 110–394 requires that fellowship funds be used only for fellowships and related administrative costs. The sea grant review panel is redesignated as the National Sea Grant Advisory Board and its duties are modified. Finally, the Act makes a number of definitional and technical changes to the *National Sea Grant College Program Act*.

Legislative History

On March 13, 2008, Delegate Madeleine Bordallo of Guam introduced H.R. 5618, the *National Sea Grant College Program Amendments Act of 2008*, which was referred to the Committee on Natural Resources. The Subcommittee on Fisheries, Wildlife, and Oceans marked up H.R. 5618, and favorably reported the bill, with an amendment, to the full Natural Resources Committee on April 23, 2008. The Natural Resources Committee held a markup session on April 30, 2008, and ordered H.R. 5618 favorably reported, with an amendment, by voice vote. On June 9, 2008, the Committee on Natural Resources favorably reported H.R. 5618, with an amendment (H.Rept. 110–701).

On June 9, 2008, H.R. 5618 was sequentially referred to the Committee on Science and Technology. The Subcommittee on Energy and Environment held a markup on June 12, 2008, and ordered H.R. 5618 favorably reported to the Full Committee by voice vote. On June 25, the Full Committee marked up H.R. 5618, and ordered the bill favorably reported, with an amendment, by voice vote. The Committee on Science and Technology favorably reported H.R. 5618, with an amendment, on July 11, 2008 (H.Rept. 110–701, Part II).

H.R. 5618, as amended, was considered and passed on a voice vote, by the House on July 14, 2008, under suspension of the rules. The bill was received in the Senate on July 15, 2008, and referred to the Committee on Commerce, Science, and Transportation. On September 26, 2008, the Committee on Commerce, Science, and Transportation was discharged of further consideration of H.R. 5618, and the Senate passed the bill, with an amendment, by unanimous consent. On September 29, 2008, the House passed H.R. 5618, with a Senate amendment, by unanimous consent. The President signed H.R. 5618 on October 13, 2008, and the bill became Public Law 110–394.

1.13—P.L. 110–417, DUNCAN HUNTER NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2009 (S. 3001)

Background and Summary of Legislation

The *Duncan Hunter National Defense Authorization Act for Fiscal Year 2009* authorizes activities of the Department of Defense, authorizes certain military construction programs, and authorizes national security activities of the Department of Energy for fiscal year 2009. In addition, certain wartime appropriations are authorized for fiscal year 2009.

The Science and Technology Committee has jurisdiction over two sections of Public Law 110–417: Sections 3113 and 3114. Section 3113 establishes a Nonproliferation and National Security Scholarship and Fellowship Program, to grant scholarships and fellowships to individuals to learn the skills needed to work on nuclear non-proliferation and security issues at the Department of Energy. Section 3114 establishes a research and development program within the Department of Energy to enhance nuclear forensics capabilities. Both of these sections are drawn from H.R. 5929, the *Nuclear Terrorism Deterrence and Detection Act*, which was initially referred to the Committee on Science and Technology, and in addition to the Committees on Armed Services, Foreign Affairs, Homeland Security, and Energy and Commerce.

Legislative History

On March 31, 2008, House Armed Services Committee Chairman Ike Skelton introduced H.R. 5658, the *Duncan Hunter National Defense Authorization Act for Fiscal Year 2009*, which was referred to the Armed Services Committee. On May 16, 2008, H.R. 5658, as amended, was reported by the Committee on Armed Services (H.Rept. 110–652). The House considered H.R. 5658 under a rule on May 21 and 22, 2008, and H.R. 5658, as amended, passed the House on May 22, 2008, by: Y–384, N–23 (Roll Call No. 365). On

June 3, 2008, H.R. 5658 was received in the Senate, and no further action was taken on H.R. 5658.

On May 12, 2008, Senate Armed Services Committee Chairman Carl Levin introduced S. 3001, the *Duncan Hunter National Defense Authorization Act for Fiscal Year 2009*. The bill was reported back to the Senate the same day (Report No. 110–335), and placed on the Legislative Calendar. S. 3001 was considered by the Senate from September 9 through September 17, and on September 17, 2008, S. 3001 passed the Senate with amendments by: Y–88, N–8 (Record Vote No. 201).

S. 3001 was received in the House on September 18, 2008, and held at the desk. On September 24, 2008, S. 3001 was considered under suspension of the rules and passed with an amendment by: Y–392, N–39 (Roll Call No. 631). On September 27, 2008, the Senate agreed to the House amendment to S. 3001 by unanimous consent, and on October 14, 2008, the President signed S. 3001. S. 3001 subsequently became Public Law 110–417.

1.14—P.L. 110–422, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT OF 2008 (H.R. 6063)

Background and Summary of Legislation

The *National Aeronautics and Space Administration Authorization Act of 2008* reauthorizes programs at the National Aeronautics and Space Administration (NASA) for fiscal year 2009, and sets out certain policy objectives for NASA. The baseline authorization in H.R. 6063 represents a 2.8 percent increase over the level authorized for NASA in FY 2007. In addition, the bill includes a special funding augmentation to accelerate the development of the Crew Exploration Vehicle (CEV), in order to minimize the Nation’s human space flight gap between the retirement of the Space Shuttle and fielding of the CEV. The bill also includes provisions to encourage the use of commercial services to transport cargo and crew to and from the International Space Station, to ensure the health of civil aviation research and development at NASA, and to better understand and respond to climate change.

P.L. 110–422 also adds an additional Space Shuttle flight to the program in order to deliver the Alpha Magnetic Spectrometer to the International Space Station. In addition, the law contains a prohibition against NASA taking any steps prior to April 30th of 2009 that would preclude the President from being able to continue to fly the Space Shuttle past 2010. This allows for the incoming administration to have a chance to review NASA’s programs and objectives and potentially reorient those objectives without excessive disruption to NASA and NASA’s highly skilled workforce.

Legislative History

On May 15, 2008, Space and Aeronautics Subcommittee Chairman Mark Udall introduced H.R. 6063, the National Aeronautics and Space Administration Authorization Act of 2008. The bill was referred to the Science and Technology Committee, and referred by the Committee to the Subcommittee on Space and Aeronautics. The Subcommittee on Space and Aeronautics held a markup session on May 20, 2008, and ordered H.R. 6063 favorably reported to the Full

Committee by voice vote. On June 4, 2008, the Science and Technology Committee marked up H.R. 6063, and ordered the amended bill favorably reported to the House by voice vote. On June 9, 2008, the Science and Technology Committee reported the amended bill to the House (H.Rept. 110–702). On June 12 and 18, 2008, the House considered H.R. 6063 under a rule. The bill was amended, and passed on June 18, 2008, by: Y–409, N–15 (Roll Call No. 421).

H.R. 6063 was received in the Senate on June 20, 2008, and referred to the Committee on Commerce, Science, and Transportation. The Commerce, Science, and Transportation Committee was discharged from further consideration of H.R. 6063 on September 25, 2008, by unanimous consent. On September 25, the Senate considered and passed H.R. 6063, with an amendment, by unanimous consent.

H.R. 6063, as passed by the Senate, was received by the House on September 26, 2008. On September 27, 2008, H.R. 6063, as amended by the Senate, was considered and passed by the House under suspension of the rules by voice vote. The President signed H.R. 6063 on October 15, 2008, and the bill subsequently became Public Law 110–422.

Chapter II—Other Legislative Activities of the Committee on Science and Technology

2.1—H.R. 85, ENERGY TECHNOLOGY TRANSFER ACT

Background and Summary of Legislation

The purpose of H.R. 85 was to recast Section 917 of the *Energy Policy Act of 2005* to provide more specificity and to make other improvements to the Advanced Energy Technology Transfer Center Program that was created by that Act.

According to Department of Energy (DOE) 2003 statistics, buildings consume more energy than any other sector of the economy, including industrial processes and transportation. Buildings consume 39 percent of primary energy in the United States and 70 percent of electricity. Innovations in energy-efficient building technologies, materials, techniques and systems combined with advances in photovoltaic and other distributed clean energy technologies have the potential to dramatically transform the pattern of energy consumption associated with buildings. These technologies—coupled with a whole building approach that optimizes the interactions among building systems and components—enable buildings to use considerably less energy, while also helping to meet national goals for sustainable development, environmental protection, and energy security.

During the first session of the 109th Congress, the Committee on Science reported energy research, development, and demonstration (RD&D) legislation that authorized programs enacted as part of the *Energy Policy Act of 2005* (EPACT) (P.L. 109–58). One of these programs, enacted as Section 917 of EPACT, established an Advanced Energy Technology Transfer Center program to improve the flow of state-of-the-art information on energy use and conservation in buildings to the building sector.

During the second session of the 109th Congress, Section 13 of H.R. 5656 was a rewrite of Section 917, adding detail to the bill's sections on priorities, uses of grants, contents of applications, and selection criteria. It also added provisions on duration, evaluation, and renewal of grants, prohibited the use of grant funds for construction of facilities, and removed the advisory committee provisions of the original Section 917.

H.R. 85 continued the effort to update this program, making minor improvements to Section 13 of H.R. 5656.

Legislative History

On January 4, 2007, H.R. 85 was introduced by Representative Biggert. The bill was referred to the Committee on Science and Technology.

On February 28, 2007, the Committee met to consider H.R. 85. An amendment in the nature of a substitute was adopted by voice vote. The Committee voted by voice vote to report the measure, as amended, to the House. On March 8, 2007, the Committee reported H.R. 85 to the House (H.Rept. 110–38). On March 12, 2007, the House suspended the rules and passed H.R. 85 by a recorded vote of 395–1.

On March 13, 2007, H.R. 85 was received in the Senate and referred to the Committee on Energy and Natural Resources. On September 17, 2007 the Committee reported H.R. 85 without amendment with a written report (110–162).

H.R. 85 was eventually included as Section 601 of S. 2739, the *Consolidated Natural Resources Act of 2008*. S. 2739 was signed into law as P.L. 110–229 on May 8, 2008.

2.2—H.R. 362, 10,000 TEACHERS, 10 MILLION MINDS SCIENCE AND MATH SCHOLARSHIP ACT

Background and Summary of Legislation

In 1995, the first Trends in International Math and Science Study (TIMSS) reported alarming data regarding American student achievement in mathematics and science. American twelfth-graders ranked behind comparable students from 17 other countries out of 21 countries in the study. Of the 16 of those countries that participated in an analysis of achievement in physics, the United States ranked last. Follow-up TIMSS studies and Programme for International Student Assessment (PISA) studies confirmed that American students were behind their peers from many other industrialized nations. For example, in the comprehensive 2003 PISA study, the United States ranked 28th out of 40 countries in mathematics achievement of 15-year-old students. Several additional reports concluded that improving the math and science achievement of American students is critical to the vision of a competitive America continuing to lead the world in technology and innovation. In particular, the National Academies 2007 report *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future* identified the following as its highest priority policy recommendation:

Increase America’s talent pool by vastly improving K–12 science and mathematics education.

Other reports echoing this same sentiment came from the National Commission on Mathematics and Science Teaching for the 21st Century (the Glenn Commission), the Council on Competitiveness, the Association of American Universities (AAU), the President’s Council of Advisors on Science and Technology, AeA (formerly the American Electronics Association), the Business Roundtable, the Electronic Industries Alliance, the National Association of Manufacturers, and TechNet.

Having a leading science and technology enterprise is not just a matter of national prestige. Science and technology is largely responsible for the innovation that drove the American economic dominance of the last half of the twentieth century and that led to high-paying jobs and a high standard of living.

The Academies report advocated for a major investment in the Nation's competitiveness. In addition to improving K–12 science and mathematics education, the report recommended investing in scientific and engineering research, recruiting and retaining the best scientists and engineers in the world, and improving the innovation climate for industry.

The *Gathering Storm* report identified specific action items to accomplish the general recommendations. Among them were recommendations to annually recruit 10,000 science and mathematics teachers by awarding scholarships, to strengthen the skills of 250,000 teachers through summer institutes and Master's degree programs, and to increase the number of U.S. citizens who earn Bachelor's degrees in STEM fields by providing 25,000 scholarships every year. The principal provisions of H.R. 362 work towards the implementation of these three action items.

The purpose of H.R. 362 was to improve K–12 mathematics, science, and technology education through recruitment, training, mentoring, and professional development of teachers; to improve laboratory experiences in secondary schools; and to increase the number of undergraduates entering science, technology, engineering, and mathematics (STEM) fields.

Legislative History

On January 10, 2007, Representative Gordon, Chairman of the Committee on Science and Technology, introduced H.R. 362. The bill was referred to the Committee on Science and Technology.

On March 28, 2007, the Committee met to consider H.R. 362. A manager's amendment offered by Representatives Gordon and Hall was agreed to by voice vote. An amendment offered by Representatives Johnson and Ehlers was agreed to by voice vote. Another amendment offered by Representative Johnson was agreed to by voice vote. Two amendments offered by Representative Giffords were agreed to by voice vote. An amendment offered by Representative Akins was agreed to by a voice vote. The Committee ordered the measure reported, as amended, by voice vote. On April 16, 2007, the Committee reported H.R. 362 to the House (H.Rept. 110–85). On April 24, 2007, the House passed H.R. 362 by a recorded vote of 389–22.

On April 25, 2007, the bill was received in the Senate, and referred to the Senate Committee on Health, Education, Labor, and Pensions. No further legislative action was taken on H.R. 362.

This bill text was generally incorporated in H.R. 2272, the *America COMPETES Act*. H.R. 2272 was signed into law as P.L. 110–69 on August 9, 2007.

2.3—H.R. 363, SOWING THE SEEDS THROUGH SCIENCE AND ENGINEERING RESEARCH ACT

Background and Summary of Legislation

While the U.S. continues to lead the world in measures of innovation capacity—research and development (R&D) spending, number of scientists and engineers, scientific output, etc.—recent statistics on the level of U.S. support for research relative to other countries indicates that this lead may be slipping. At the same time,

other nations—particularly emergent nations such as China and India—have recognized the importance of innovation to economic growth, and are pouring resources into their scientific and technological infrastructure, rapidly building their innovation capacity and increasing their ability to compete with the United States in the global economy.

A number of reports have outlined the issues that the United States faces as it tries to maintain a position of leadership in science and technology and have offered recommendations for what the Nation should do to ensure its economic and national security. The National Academy of Sciences (NAS) report, *Rising Above the Gathering Storm*, described how science and engineering are critical to American prosperity, examines how the United States is doing relative to other countries in science and technology today and made recommendations on how federal programs in support of research and education could be improved to position the Nation to make the next generation of innovations needed to maintain U.S. competitiveness and security going forward. Other reports on this topic include the National Innovation Initiative from the Council on Competitiveness, which emphasized the need to strengthen the innovation infrastructure in the United States to ensure future prosperity, and the National Defense Education and Innovation Initiative, from the Association of American Universities, which focused on actions universities and the Federal Government can take to meet oncoming economic and security challenges.

H.R. 363 focused on some of the recommendations made in these reports that relate to science and technology research funding. It strengthened federal support for science and engineering researchers at the early stages of their careers, expanded the Integrative Graduate Education and Research Traineeship program at NSF, established a Presidential Innovation Award, established a coordination office for research infrastructure, and authorized the National Science Foundation to support research on innovation.

Legislative History

On January 10, 2007, Representative Gordon, Chairman of the Committee on Science and Technology, introduced H.R. 363. The bill was referred to the Committee on Science and Technology.

On February 28, 2007, the Committee met to consider H.R. 363. A manager's amendment offered by Representatives Gordon and Hall was agreed to by voice vote. The Committee ordered the measure, as amended, reported by voice vote. On March 8, 2007, the Committee reported H.R. 363 to the House (H.Rept. 110–39). On April 24, 2007, the House passed H.R. 363 by a recorded vote of 397–20.

On April 25, 2007 the bill was received in the Senate, and referred to the Senate Committee on Health, Education, Labor, and Pensions.

This bill text was generally incorporated in H.R. 2272, the *America COMPETES Act*. H.R. 2272 was signed into law as P.L. 110–69 on August 9, 2007.

2.4—H.R. 364, PROVIDING FOR THE ESTABLISHMENT OF AN ADVANCED RESEARCH PROJECTS AGENCY FOR ENERGY

Background and Summary of Legislation

The purpose of the bill was to establish the Advanced Research Projects Agency–Energy (ARPA–E) within the Department of Energy and set up an Energy Transformation Acceleration Fund to conduct activities under the Act. H.R. 364 followed a recommendation of the National Academies 2005 report, *Rising Above the Gathering Storm*, which, as part of a host of recommendations, called on the Federal Government to create a new energy research agency within the Department of Energy patterned loosely on the successful Defense Advanced Research Projects Agency (DARPA) within the Department of Defense. According to the *Gathering Storm* report, ARPA–E should be structured to “sponsor creative, out-of-the-box, transformational, generic energy research in those areas where industry itself cannot or will not undertake such sponsorships, where risks and potential payoffs are high, and where success could provide dramatic benefits for the Nation. ARPA–E would accelerate the process by which research is transformed to address economic, environmental, and security issues. It would be designed as a lean, effective, and agile—but largely independent—organization that can start and stop targeted programs based on performance and ultimate relevance.”

The push for new energy technologies is especially urgent given the geopolitical forces that threaten global energy supplies and economic stability, the rising costs of energy to consumers, the looming threat of global climate change, and probable regulation of carbon dioxide emissions. In addition to addressing the Nation’s energy challenges, the *Gathering Storm* report also concluded that ARPA–E would contribute to U.S. competitiveness by playing an important role in “advancing research in engineering, the physical sciences, and mathematics; and in developing the next generation of researchers.”

ARPA–E utilizes an organizational structure and approaches projects in a way that is fundamentally different from that of the traditional energy research enterprise. Critics of the Department of Energy’s management of research programs contend that the stove-piped structure and bureaucratic culture of DOE is not conducive to the rapid development of cross-cutting energy solutions, or translating basic research discoveries into technology applications for the marketplace. Potentially revolutionary research may be too risky or multi-disciplinary to fit into a specific program’s mission at DOE, and the peer review system tends to favor established investigators pursuing incremental advances in well-understood concepts. DOE is also criticized for requiring inordinate amounts of time to start up research projects, not looking broadly enough for research participants, and then sustaining support for projects and people beyond a timeframe where meaningful results are likely.

Under H.R. 364, ARPA–E is a relatively flat and nimble organization, similar to the small, flexible, non-hierarchical reporting structure that supported a unique and highly successful culture of innovation at DARPA. The director of ARPA–E reports directly to the Secretary of Energy, and no other programs report to ARPA–

E. Projects will not undergo the traditional peer-review process. Instead, Program Managers and their superiors are given extraordinary autonomy and resources to pursue unique technology pathways at will, to assemble quickly teams of researchers and technology developers, and to just as quickly change course or terminate research projects that do not look fruitful.

As in DARPA, Program Managers for ARPA-E will be exceptionally talented, creative and knowledgeable, experienced in industry or academia, and passionate in pursuit of their objectives. Due to the flexible hiring authority that is written into Section 2 of the bill, talented Program Managers can be recruited from a variety of fields, hired for a term of approximately three years, and paid a salary commensurate with what they would make in the private sector.

The *Gathering Storm* report calls for ARPA-E to be authorized at \$300 million in the first year, and quickly escalate to \$1 billion within five years. Initial funding for ARPA-E in H.R. 364 is set at \$300 million, and increases to \$1 billion in the second year to allow ARPA-E to be fully operational more quickly.

Legislative History

H.R. 364 was introduced by Representative Gordon, Chairman of the Committee on Science and Technology, on January 10, 2007. The bill was referred to the Committee on Science and Technology.

On May 10, 2007, the Subcommittee on Energy and Environment met to consider H.R. 364. An amendment offered by Representatives Lampson, Giffords, and Bartlett was agreed to by voice vote. An amendment offered by Representative Biggert was defeated by voice vote. H.R. 364 was reported, as amended, to the Full Committee.

On May 23, 2007, the Committee met to consider H.R. 364. A manager's amendment was offered by Representative Gordon, and was agreed to by voice vote. An amendment in the nature of a substitute offered by Representatives Hall, Gingrey, and Biggert was defeated on recorded vote of 12–24. An amendment offered by Representative Inglis was agreed to by voice vote. An amendment offered by Representative Biggert was defeated by a recorded vote of 11–19. Another amendment offered by Representative Biggert was defeated by a recorded vote of 13–23. An amendment offered by Representative Ehlers was defeated by voice vote. An amendment offered by Representative Bilbray was defeated by voice vote. An amendment offered by Representative Smith of Nebraska was defeated by a recorded vote of 13–25. An amendment offered by Representative Gingrey was defeated by a recorded vote of 13–25. An amendment offered by Representative Akin was defeated by voice vote. An amendment offered by Representative Diaz-Balart, presented by Representative McCaul, was defeated by a recorded vote of 12–23. An amendment offered by Representative Gingrey was agreed to by voice vote. The bill was approved for final passage by a recorded vote of 25–12. H.R. 364, as amended, was ordered reported by voice vote. No further legislative action was taken on H.R. 364.

A similar provision was subsequently included as Section 5012 of H.R. 2272, the *America COMPETES Act*. H.R. 2272 was signed into law as P.L. 110–69 on August 9, 2007.

2.5—H.R. 547, ADVANCED FUELS INFRASTRUCTURE RESEARCH AND DEVELOPMENT ACT

Background and Summary of Legislation

The purpose of the bill is to facilitate the development of markets for biofuels and Ultra Low Sulfur Diesel fuel through research and development, including data collection and demonstration of research and development results.

Ethanol and Biodiesel Infrastructure Compatibility—There are over 100 ethanol refineries in operation today, with many more in various stages of planning. Ethanol is currently blended with roughly 40 percent of the Nation’s gasoline supply, usually as an oxygenate and at concentrations of approximately 10 percent of the fuel by volume. Similarly, biodiesel is used as additive in diesel fuel because of its good lubricating properties and lack of sulfur, but seldom in concentrations higher than 20 percent.

Biofuels such as E85 and biodiesel have different physical and chemical properties that make them incompatible with existing transportation, distribution, and retail infrastructure and hardware. These fuels are associated with a variety of technical issues relating to corrosion of tank and pipeline materials, increased buildup and dissolving of storage tank sediment, filter clogging, electrical conductivity, water and microbial contamination, varying flow rates, and thermal and oxidative instability. The degrading and corrosive effects are most problematic since this can affect the glues, corks, rubbers, plastics and many metal compounds used in hoses, gaskets, seals, elastomers, regulators, pipe welds, and other fittings.

It may be possible to develop additives and blendstocks that would mitigate certain negative effects of biofuels and avoid the need for expensive modification and replacement of existing infrastructure and hardware. It may also be possible to develop safer and less destructive infrastructure refurbishment methods and technologies. Therefore, Section 3 of H.R. 547 directed the Assistant Administrator of the Office of Research and Development of the Environmental Protection Agency, in consultation with the Secretary of Energy and the National Institute of Standards and Technology, to develop additives, blendstocks, technologies and methods to address these concerns.

Ultra Low Sulfur Diesel—In 2000, the Environmental Protection Agency (EPA) instituted a program to lower the emissions of diesel fuels by approximately 97 percent. Federal regulations mandated that after an initial phase-in period, beginning June 1, 2006, all diesel fuel refined and sold in the U.S. must be Ultra Low Sulfur Diesel (ULSD). ULSD is diesel fuel containing less than 15 parts per million (ppm) of sulfur. Prior to this time retailers sold Low Sulfur Diesel (LSD) containing up to 500 ppm of sulfur. The reduction in the sulfur content of diesel fuel served to mitigate the acid rain-causing effects of sulfur compounds and also allowed for the

introduction in 2007 of advanced diesel engine technologies that would otherwise foul with high concentrations of sulfur.

Major challenges remain at various points of the ULSD distribution chain. Prior to and during the transition to ULSD, there were widespread concerns throughout the industry that as ULSD moves from the refinery through the pipelines, tanks, trucks and related infrastructure it can absorb residual sulfur left by other, high-sulfur fuel products. Products such as Low Sulfur Diesel with up to 500 ppm sulfur, Jet Fuel with 3000 ppm, and even Heating Oil with up to 5000 ppm utilize much of the same infrastructure as ULSD. The fuel industry feared that contamination could result in diesel fuel arriving at fueling stations with sulfur content that exceeded 15 ppm, thus exposing 'downstream' retailers and distributors to liability and fines of up to \$32,500 for the sale of noncompliant fuels. While other aspects of the transition to ULSD have gone smoothly by most all accounts, the development of less expensive, robust, accurate and rapid testing methods would enable more frequent testing of fuel sulfur content to assure that regulated limits are not exceeded and rapid correction of any contamination problems that may occur along the distribution chain.

Further steps that can be taken to improve measurement accuracy for diesel fuels involve working with analytical instrument manufacturers and commercial suppliers of calibration materials to transfer the inherent accuracy of Standard Reference Materials developed by NIST to calibration standards used for field testing instrumentation. Therefore, Section 4 of H.R. 547 directed the Assistant Administrator of the Office of Research and Development of the Environmental Protection Agency, in consultation with the National Institute of Standards and Technology, to develop portable, low cost, and accurate technologies for testing sulfur content of diesel fuels, and begin demonstrations of such technologies within one year.

Section 5 directed NIST to compile a database of physical properties for alternative fuels, and use these data to develop Standard Reference Materials (SRMs) such as those NIST develops for conventional fuels.

Legislative History

On January 18, 2007, Representative Gordon, the Chairman of the Committee on Science and Technology, introduced H.R. 547. The bill was referred to the Committee on Science and Technology.

The Committee met on January 31, 2007 to consider H.R. 547. A manager's amendment was offered by Representative Gordon and adopted by voice vote. H.R. 547, as amended, was reported by the Committee to the House on February 5, 2007 (H.Rept. 110-7). On February 8, 2007, the House passed H.R. 547 by a recorded vote of 400-3.

The bill was received in the Senate and, on February 17, 2007, was referred to the Senate Committee on Environment and Public Works. No further action was taken on H.R. 547.

The text of H.R. 547 was partially incorporated in H.R. 6, the *Energy Independence and Security Act of 2007*. H.R. 6 was signed into law as P.L. 110-140 on December 19, 2007.

2.6—H.R. 632, H-PRIZE ACT OF 2007

Background and Summary of Legislation

Hydrogen gas is considered by many experts to be a promising fuel, particularly in the transportation sector. When used as a fuel, its only combustion byproduct is water vapor. The widespread adoption of hydrogen as a transportation fuel has the potential to reduce or eliminate air pollution generated by cars and trucks.

However, unlike coal or oil, the hydrogen gas used as a fuel is not a naturally occurring energy resource. Hydrogen must be produced from hydrogen-bearing compounds, like water or natural gas, and that requires energy—and, unlike gasoline or biofuels, more energy is always required to produce it than is recovered when hydrogen is burned in a fuel cell. Hydrogen has the potential to reduce America's dependence on foreign oil, but the degree to which hydrogen will displace foreign energy supplies depends on what energy source is used to generate hydrogen gas in the first place.

If hydrogen can be produced economically from energy sources that do not release carbon dioxide into the atmosphere—from renewable sources such as wind power or solar power, from nuclear power, or possibly from coal with carbon sequestration, then the widespread use of hydrogen as a fuel could make a major contribution to reducing the emission of greenhouse gases.

While the promise of hydrogen is great, so are the technical challenges. Experts suggest that major advances will be required across a wide range of technologies for hydrogen to be affordable, safe, cleanly produced, and readily distributed. The production, storage, and use of hydrogen all present significant technical challenges. While Department of Energy (DOE) research programs have produced promising advances, much work must still be done to meet the goal of developing economically viable hydrogen technologies.

Prizes are one tool the Federal Government can employ to stimulate efforts to overcome such technical hurdles. A 1999 National Academy of Engineering (NAE) panel examining the use of prizes by federal agencies suggested the following design principles for prize programs:

1. Treatment of intellectual property resulting from prize contests should be properly aligned with the objectives and incentive structure of the prize contest.
2. Contest rules should be seen as transparent, simple, fair, and unbiased.
3. Prizes should be commensurate with the effort required and goals sought.

H.R. 632 created a prize program at DOE for advances in hydrogen technologies to be administered through a private, non-profit entity. DOE is to award three types of prizes in the following categories:

1. Prizes of not more than \$1 million to be awarded every other year to the best technology advancements in components or systems related to each of hydrogen production, hydrogen storage, hydrogen distribution, and hydrogen utilization.

2. A prize of not more than \$4 million to be awarded for prototypes of hydrogen-powered vehicles or hydrogen-based products that best meet or exceed objective performance criteria. Awards for the prototype prize are to be given in alternate years from the technology advancement prizes.
3. A prize of at least \$10 million to be awarded for transformational changes in technologies for the production and distribution of hydrogen that meet or exceed far-reaching objective criteria. The federal contribution is limited to \$10,000,000, and a private fundraising goal of \$40,000,000 is set. Prize money over \$10,000,000 may be provided as matching funds for every dollar of private funding raised by the winner for the continued development and commercialization of their winning technology.

Legislative History

On January 23, 2007, Representative Lipinski introduced H.R. 632. The bill was referred to the Committee on Science and Technology.

The Energy and Environment Subcommittee met on May 10, 2007 to consider H.R. 632. No amendments were offered. The bill was reported by voice vote to the Committee.

The Committee met on May 23, 2007 to consider H.R. 632. An amendment in the nature of a substitute was offered by Representative Inglis and was agreed to by a voice vote. The Committee voted by voice vote to report the measure, as amended, to the House. On June 5, 2007, the Committee reported H.R. 632 to the House (H.Rept. 110–171). On June 6, 2007, the House voted to suspend the rules and pass H.R. 632 on a recorded vote of 408–8.

On June 7, 2007, H.R. 632 was received in the Senate and referred to the Committee Energy and Natural Resources. No further legislative action was taken on H.R. 632.

The text of H.R. 632 was generally incorporated as Section 654 of H.R. 6, the *Energy Independence and Security Act of 2007*. H.R. 6 was signed into law as P.L. 110–140 on December 19, 2007.

2.7—H.R. 694, MINORITY SERVING INSTITUTION DIGITAL AND WIRELESS TECHNOLOGY OPPORTUNITY ACT

Background and Summary of Legislation

H.R. 694 amended the *Stevenson-Wydler Technology Innovation Act of 1980* to direct the Secretary of Commerce to establish a Minority Serving Institution Digital and Wireless Technology Opportunity Program to assist eligible educational institutions in acquiring, and augmenting use of, digital and wireless networking technologies to improve the quality and delivery of educational services at such institutions. The bill defined as eligible institutions: (1) historically Black colleges or universities, (2) a Hispanic-, Alaskan Native-, or Native Hawaiian-serving institution; (3) a tribally controlled college or university; or (4) an institution with a sufficient enrollment of needy students as defined under the *Higher Education Act of 1965*. It also directed the Secretary to: (1) establish an advisory council to advise on the best approaches toward maximum Program participation by eligible institutions; and (2) ensure

that grant awards are made to all types of eligible institutions. Finally, the bill required Program assessment every three years by the National Academy of Public Administration.

Legislative History

Representative Towns introduced H.R. 694 on January 24, 2007. The bill was referred to the Committee on Science and Technology, and the Committee on Education and Labor.

On September 4, 2007, the House suspended the rules and passed H.R. 694 on a recorded vote of 331–59.

On September 4, 2007, H.R. 694 was received in the Senate and subsequently referred to the Committee on Commerce, Science, and Transportation. No further legislative action was taken on H.R. 694.

The text of H.R. 694 was later incorporated in Title IX, Part G, of H.R. 4137, the *Higher Education Opportunity Act*. H.R. 4137 was signed into law as P.L. 110–315 on August 14, 2008.

2.8—H.R. 906, GLOBAL CHANGE RESEARCH AND DATA MANAGEMENT ACT OF 2007

Background and Summary of Legislation

The purpose of the H.R. 906 is to re-orient the U.S. Global Change Research Program (USGCRP) to produce more policy-relevant information and facilitate greater exchange of that information with regional, State, and local governments and with other non-governmental user groups. The requested budget for the major climate change science programs in 2007 was estimated by the Congressional Research Service to be \$1.7 billion dollars. The participating agencies include virtually every department in the Federal Government: NASA, NSF, NOAA, DOE, USDA, DOI, HHS, EPA, the Smithsonian Institution and DOD. The core agencies that have contributed to climate change science are NASA, NOAA, NSF, and DOE.

The Climate Program preceded the USGCRP and was established by the *National Climate Program Act* (P.L. 95–367) in 1978. The Climate Program was intended to provide conduct climate research, provide climate information, and to support policy decisions to “assist the Nation and the world to understand and respond to natural and human-induced climate processes and their implications” (P.L. 95–367, § 3). It was established as an interagency program coordinated through a National Climate Program Office within the National Oceanic and Atmospheric Administration (NOAA). By the mid-1980s Congress began to consider expanding the Climate Program. At the time, the program was thought to be producing high quality science, but it was not providing information that would lead to policy responses to threats from climate change.

After several years of work, Congress passed the *U.S. Global Change Research Act of 1990* (P.L. 101–606) which established the U.S. Global Change Research Program we have today. The law codified the interagency structure put in place by the Reagan Administration and defined the agencies that would participate in the program. The law also required development of a series of 10-year Plans for the conduct of research on global change by the Federal

Government to: “advance scientific understanding of global change and provide usable information on which to base policy decisions related to global change,” an evaluation of the Plan by the National Research Council, the coordination of agency budgets for global change research, and a report to Congress every four years on the consequences of climate change. While research Plans have been produced periodically by the Program and reviewed by the National Research Council as required by the law, the production of periodic assessments of the findings of the global change program and the effects of global change on natural systems and sectors of the economy has been lacking.

H.R. 906 directed the President to designate an interagency committee to coordinate all federal research activities in the area of global change and to facilitate the use of that information by agencies with authority over resources likely to be affected by global change. The interagency committee is directed to develop and implement a Research and Assessment Plan to guide and communicate the results of the program, respectively. The Plan is revised on a five-year cycle. The Office of Science and Technology Policy (OSTP) is designated as the lead agency for the program and \$10 million per year is authorized to fund activities that are included in the Plan, that involve two or more participating agencies, and for which no funding is provided in individual agency budgets. The Director of OSTP is required to conduct at least one workshop in each of the regions of the U.S. identified under the Plan to facilitate information exchange between the federal program and regional, State, and local governments and other interested non-federal parties.

The Plan must be reviewed for its scientific merit by the National Academy of Sciences. In order to ensure the policy-relevance of information produced through this Program, H.R. 906 included a review of the Research and Assessment Plan by the Center for Best Practices of the National Governors Association. The Center will convene a group under a contract from the Federal Government to assess the Plan from the perspective of regional, State, and local governments. The Plan is also subject to a public comment period of at least 60 days.

The President is required to submit to Congress an assessment that integrates the scientific findings of the program, analyzes current trends in global change and projects the trends for 25- and 100-year periods into the future; analyzes changes in the environment and key socioeconomic sectors for major geographic regions of the U.S.; and analyzes the implications of the potential impacts of global change in other regions of the world on the U.S. and on U.S. international assistance and other international interests. In addition, H.R. 906 requires a policy assessment intended to provide information about the range of policy options available to adapt and mitigate climate change. It also includes authorization for several targeted studies by the National Academy of Sciences on two subjects with important implications for the U.S., especially for coastal communities: the potential for significant sea level rise due to ice sheet melting and the potential for increased intensity of hurricanes and typhoons.

H.R. 906 also directed the President to designate an interagency committee to coordinate the collection, management, archiving, and distribution of the many data bases and data sets controlled by various agencies of the Federal Government. The committee is required to report to Congress on the status of global observing networks, the maintenance of climate and global change data records, and the status of efforts to better coordinate the data collection, archiving and distribution functions of all participating federal agencies.

Finally, H.R. 906 directed the President through the Secretary of State to facilitate U.S. leadership and participation in international global change research efforts and energy research.

Legislative History

On February 7, 2007, Representative Udall introduced H.R. 906. The bill was referred to the Committee on Science and Technology, and in addition to the Committee on Foreign Affairs.

The Subcommittee on Energy and Environment met to consider H.R. 906 on June 6, 2007. Representative Udall offered a manager's amendment, which was adopted by voice vote. The Subcommittee reported the bill, as amended, to the Committee by a voice vote.

The Committee met to consider H.R. 906 on June 27, 2007. Representative Udall offered a manager's amendment, which was adopted by voice vote. Another amendment offered by Representative Udall was adopted by voice vote. Representative Gingrey offered an amendment, which was agreed to by voice vote. An amendment offered by Representative Woolsey was agreed to by voice vote. Representative Johnson offered an amendment, which was also agreed to by voice vote. The Committee voted by voice vote to report the bill, as amended, to the House. On April 24, 2008, the Committee reported H.R. 906 to the House (H.Rept. 110-605, Part 1). No further legislative action was taken on H.R. 906.

H.R. 906 was eventually incorporated into H.R. 3221, the *New Direction for Energy Independence, National Security, and Consumer Protection Act* as Subtitle G of Title IV. H.R. 3221 was introduced on July 30, 2007. H.R. 3221 passed the House on August 4, 2007 on a recorded vote of 241-172.

2.9—H.R. 1068, A BILL TO AMEND THE HIGH-PERFORMANCE COMPUTING ACT OF 1991

Background and Summary of Legislation

High-performance computing and networking is an essential component of U.S. scientific, industrial, and military competitiveness, and the U.S. is still highly competitive in this field. The depth and strength of U.S. capability stems in part from the sustained research and development program carried out by federal research agencies under the National Networking and Information Technology R&D (NITRD) program codified by the *High-Performance Computing Act of 1991*. That Act is widely credited with reinvigorating U.S. high-performance computing capabilities after a period of relative decline during the late 1980s.

The Federal Government promotes high-performance computing and networking in several different ways. First, it funds research and development at universities, government laboratories and companies to help develop new hardware and software; second, it funds the purchase of high-performance computers for universities and government laboratories and supports access to high-speed networks; and third, it provides access to high-performance computers for a wide variety of researchers by allowing them to use government-supported computers at universities and government laboratories.

The NITRD program includes activities at the National Science Foundation (NSF), the National Institutes of Health (NIH), the Department of Defense (DOD), the Department of Energy (DOE) Office of Science, the National Aeronautics and Space Administration (NASA), the National Institute of Standards and Technology (NIST), the National Oceanic and Atmospheric Administration (NOAA), and the Environmental Protection Agency (EPA). The program includes several program component areas including high-end computing (often referred to as supercomputing); large scale networking; human-computer interaction and information management; cyber security; high confidence software and systems; social, economic and workforce implications of information technology; and software design and productivity.

The purpose of H.R. 1068 was to revitalize interagency coordination and planning for the NITRD program and to focus greater attention and resources on federal high-performance computing programs.

Legislative History

On February 15, 2007, Representative Baird introduced H.R. 1068. The bill was referred to the Committee on Science and Technology.

On February 28, 2007, the Committee considered H.R. 1068. No amendments were offered. The Committee voted by voice vote to report the bill to the House. On March 8, 2007, the Committee reported H.R. 1068 to the House on March 8, 2007 (H.Rept. 110-40). On March 12, 2007, the House suspended the rules and passed H.R. 363 by a recorded vote of 397-20.

On April 25, 2007 the bill was received in the Senate, and referred to the Committee on Commerce, Science, and Transportation. No further legislative action was taken on H.R. 1068.

The bill text of H.R. 1068 was generally incorporated as Section 7024 of H.R. 2272, the *America COMPETES Act*. H.R. 2272 was signed into law as P.L. 110-69 on August 9, 2007.

2.10—H.R. 1126, TO REAUTHORIZE THE STEEL AND ALUMINUM ENERGY CONSERVATION AND TECHNOLOGY COMPETITIVENESS ACT OF 1988

Background and Summary of Legislation

The purpose of H.R. 1126 was to reauthorize a program of energy efficiency research and development (R&D) at the Department of Energy (DOE) focused on the domestic metals industry. Specifically, the bill reauthorized the *Steel and Aluminum Energy Con-*

servation and Technology Competitiveness Act of 1988, and made minor modifications to that Act.

DOE's steel-related energy efficiency R&D program was established in 1986. The program was expanded to a broader 'metals initiative' in 1988 when the President signed into law the *Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988*. Reauthorization of appropriations for the program occurred in 1992 with the passage of the *Energy Policy Act*. Authorization of appropriations expired in 1997, although Congress continued to appropriate funds for the program each year since then as part of the Industries of the Future program at DOE.

The bill amended the *Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988*. Primarily, the bill authorized appropriations each year for fiscal years 2008 through 2012 for the Department of Energy. The bill also updated priorities to be considered in research planning, repealed a section related to National Institute of Standards and Technology (NIST) programs that have been inactive, and reinstated the annual report requirement for DOE.

Legislative History

On February 16, 2007, Representative Lipinski introduced H.R. 1126. The bill was referred to the Committee on Science and Technology.

On February 28, 2007, the Committee met to consider H.R. 1126. No amendments were offered. The Committee ordered the bill reported by voice vote. The bill was reported to the House on March 8, 2007 (H.Rept. 110-41). On March 12, 2007, the House suspended the rules and passed H.R. 1126 by voice vote.

On March 13, 2007, H.R.1126 was received in the Senate and referred to the Committee Energy and Natural Resources. On September 17, 2007 the Committee reported H.R. 1126, without amendment (S.Rept. 110-181). On June 11, 2008, the Senate moved by unanimous consent to indefinitely postpone floor action on the measure.

The bill text of H.R. 1126 was generally incorporated as Section 602 of S. 2739, the *Consolidated Natural Resources Act of 2008*. S. 2739 was signed into law as P.L. 110-229 on May 9, 2008.

2.11—H.R. 1205, CORAL REEF CONSERVATION AMENDMENTS ACT OF 2007

Background and Summary of Legislation

H.R. 1205 amended the *Coral Reef Conservation Act of 2000* to extend the award of remaining coral reef conservation program grant funds, in addition to projects addressing emerging priorities or threats, to other appropriate projects, including monitoring and assessment, research, pollution reduction, education, and technical support, and revises the criteria for project approval.

The bill also included cooperative research and activities designed to minimize the likelihood of physical reef damage in the activities that may be taken under an existing program to conserve coral reefs and reef ecosystems.

It authorized the Administrator to: (1) make community-based planning grants to certain entities that are eligible to receive a coral reef conservation grant to work with local communities and federal and State entities to implement plans for increased protection of high priority coral reefs; (2) maintain an inventory of all vessel grounding incidents involving coral reefs; and (3) identify all coral reefs with a high incidence of vessel impacts and identify measures to reduce such impacts.

It established the U.S. Coral Reef Task Force to coordinate federal actions to preserve and protect coral reef ecosystems, and authorized the Secretary of Commerce to conduct activities to improve and promote the resilience of coral reefs and coral reef ecosystems.

It authorized appropriations: (1) for a research facility for coral reef research and protection, and coastal ecology and development, at the American Samoa Community College; and (2) to provide funds to the University of Guam for coral reef research and protection. Finally, it authorized the Administrator to enter into, renegotiate, or extend a cooperative agreement with any university or local academic institution or other research center with established programs that support coral reef conservation.

Legislative History

On February 27, 2007, Representative Faleomavaega introduced H.R. 1205. The bill was referred to the Committee on Natural Resources, and the Committee on Science and Technology.

On October 22, 2007, the Committee discharged H.R. 1205. On October 22, 2007, the House suspended the rules and passed H.R. 1205 on a voice vote.

On October 23, 2007, H.R. 1205 was received in the Senate and referred to the Committee on Commerce, Science, and Transportation. No further legislative action was taken on H.R. 1205.

2.12—H.R. 1467, 10,000 TRAINED BY 2010 ACT

Background and Summary of Legislation

Health care information technology (“health IT”), if properly implemented, will cut down on the estimated 44,000–98,000 annual American deaths related to medical errors and on the nearly \$300 billion spent annually on inefficient and unnecessary treatments. Electronic health care technology cannot be effective, however, without a workforce in place to manage the technology and unless those who will use health IT to perform their duties are properly trained.

Despite federal assistance to other areas of health IT, there is no systematic plan for training of the current health care workforce to use health information technology in the current jobs. Additionally, the need for individuals who specialize in managing health IT is expected to grow, and nearly 75 percent of health organizations say that there are not enough qualified applicants to fill open health IT management positions.

H.R. 1467 authorized the National Science Foundation to award grants to institutions of higher education to develop and offer education and training programs.

Legislative History

On March 9, 2007, Representative Wu introduced H.R. 1467. The bill was referred to the Committee on Science and Technology.

On May 23, 2007, the Committee met to consider H.R. 1467. No amendments were offered, and the Committee voted by voice vote to report the bill to the House. On June 5, 2007, the Committee reported H.R. 1467 to the House (H.Rept. 110–172). On June 6, 2007, the House agreed to a motion to suspend the rules and pass H.R. 1467 by a voice vote.

On June 7, 2007 the bill was received in the Senate and referred to the Committee on Health, Education, Labor, and Pensions. No further legislative action was taken on H.R. 1467.

2.13—H.R. 1657, TO ESTABLISH A SCIENCE AND TECHNOLOGY SCHOLARSHIP PROGRAM TO AWARD SCHOLARSHIPS TO RECRUIT AND PREPARE STUDENTS FOR CAREERS IN THE NATIONAL WEATHER SERVICE AND IN NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION MARINE RESEARCH, ATMOSPHERIC RESEARCH, AND SATELLITE PROGRAMS

Background and Summary of Legislation

H.R. 1716 authorized the Administrator of the National Oceanic and Atmospheric Administration (NOAA) to establish a Science and Technology Scholarship Program to award scholarships to students at institutions of higher education to recruit and prepare them for careers in the National Weather Service and in NOAA marine research, atmospheric research, and satellite programs.

It required individuals to be selected to receive scholarships through a competitive process primarily based on academic merit, with consideration given to financial need and to the goal of promoting the participation of women, minorities, and persons with disabilities as identified under provisions of the *Science and Engineering Equal Opportunities Act*.

It further required the Administrator to enter into contractual agreements with selected individuals under which such individuals, in exchange for receiving a scholarship, agree to serve as full-time employees of NOAA, for a 24-month period of obligated service for each academic year for which a scholarship is provided in positions needed by NOAA in marine research, atmospheric research, and satellite programs.

It instructed the Administrator to make publicly available a list of academic programs and fields of study for which scholarships may be utilized in marine research, atmospheric research, and satellite programs and to update such list as necessary.

Legislative History

On March 22, 2007, Representative Rohrabacher introduced H.R. 1657. The bill was referred to the Committee on Science and Technology.

On September 17, 2007, the House suspended the rules and passed H.R. 1657 on a recorded vote of 360–16.

On September 18, 2007, H.R. 1657 was received in the Senate and referred to the Committee on Commerce, Science, and Transportation. No further legislative action took place on H.R. 1657.

2.14—H.R. 1716, GREEN ENERGY EDUCATION ACT OF 2007

Background and Summary of Legislation

H.R. 1716 addressed a significant opportunity for energy savings and greenhouse gas emissions reductions: energy consumption in buildings. According to Department of Energy (DOE) 2003 statistics, buildings consume more energy than any other sector of the economy, including industrial processes and transportation. Buildings consume 39 percent of primary energy in the United States and 70 percent of electricity. Innovations in high-performance building technologies, materials, techniques and systems, combined with advances in photovoltaic and other distributed clean energy technologies, have the potential to dramatically transform the pattern of energy consumption associated with buildings. These building systems and components—coupled with a whole building approach that optimizes the interactions among building systems and components—enable buildings to use considerably less energy, while also helping to meet national goals for sustainable development, environmental protection, and energy security. Achieving this depends on architects, engineers, contractors and other buildings professionals working together from the earliest stages of planning.

H.R. 1716 provided interdisciplinary education and training in high-performance building design and construction to the next generation of architects and engineers. The purpose of this bill was to authorize higher education curriculum development and graduate training in advanced energy and green building technologies.

Legislative History

On March 27, 2007, Representative McCaul introduced H.R. 1716. The bill was referred to the Committee on Science and Technology.

On May 23, 2007, the Committee met to consider H.R. 1716. An amendment offered by Representative McCaul was adopted by voice vote. The Committee voted by voice vote to report the bill, as amended, to the House. On June 5, 2007, the Committee reported H.R. 1716 to the House (H.Rept. 110–173). On June 6, 2007, the House suspended the rules and passed H.R. 1716 by a recorded vote of 416–0.

On June 7, 2007, the bill was received in the Senate, and referred to the Committee on Energy and Natural Resources. No further legislative action was taken on H.R. 1716.

2.15—H.R. 1834, NATIONAL OCEAN EXPLORATION PROGRAM ACT

Background and Summary of Legislation

In 2004, the U.S. Commission on Ocean Policy, whose members were appointed by President George W. Bush, released a report containing recommendations for the establishment of a comprehen-

sive and coordinated ocean policy for the Nation. The report concluded, among many other findings, that increased scientific knowledge of the oceans and coasts and the associated technological development to gather such information were imperative for sustainable resource use, economic development, and conservation of marine biodiversity. In order to attain these goals, a comprehensive national strategy is needed, and legislation is required to implement many of the Commission's recommendations.

In 1971, NOAA administratively established the Manned Undersea Science and Technology (MUST) program to pioneer exploration of undersea habitats. In 1980, the MUST program was reconstituted as the National Undersea Research Program (NURP) within NOAA's Office of Ocean and Atmospheric Research (OAR). NURP was created to provide marine scientists with the requisite tools and expertise to investigate the undersea environment. NURP is comprised of a network of six regional centers and one national technology institute, located at major universities. These university-based centers also provide unique training and educational opportunities for students. Federal grants fund the regional centers and national technology institute and each facility undergoes periodic external review to ensure performance and accountability. NURP supports on average over 100 peer-reviewed research projects each year that are relevant to NOAA's overall mission and address national ocean research priorities. Since 1995, Congress has appropriated over \$178 million specifically for NURP.

In 2000, President William J. Clinton's Panel on Ocean Exploration—a multi-disciplinary group of ocean experts—released a historic report entitled *“Discovering Earth's Final Frontier: A U.S. Strategy for Ocean Exploration.”* In 2001, NOAA responded to the panel's recommendations and established the Office of Ocean Exploration (OE) to support expeditions for the purpose of discovery and documentation of ocean resources. Also located in OAR, the OE program operates under a multi-purpose mission to map the physical, biological, chemical and archaeological aspects of the oceans and the Great Lakes; to expand understanding of ocean dynamics and to describe the complex interactions of the living ocean. The OE program has conducted multiple voyages every year since 2001, often in collaboration with other NOAA programs and federal agencies such as NURP, the National Marine Sanctuary Program and the National Science Foundation. The Congress has appropriated \$118.5 million to support this program since its establishment in 2001.

H.R. 1834 implemented a key recommendation of the U.S. Commission on Ocean Policy to provide specific and separate authorizations for these two programs within NOAA. The purpose of H.R. 1834 was to authorize the national ocean exploration program and the national undersea research program within the National Oceanic and Atmospheric Administration. The authorizations would further strengthen NOAA's standing as the preeminent civilian federal ocean agency by granting the agency explicit authority to conduct scientific research that directly contributes to increasing scientific knowledge of the world's oceans. The legislation addressed the national need to develop and advance new innovations in oceanographic research, communication and navigation tech-

nologies to support ocean exploration and science. Additionally, the legislation emphasized the importance of outreach and public education to ensure that future scientific discoveries and benefits are disseminated to decision-makers in both the public and private sectors, and conveyed to the general public to increase public awareness and appreciation of the Great Lakes and the world's oceans and their importance to our economic and environmental well-being.

Legislative History

On March 29, 2007, Representative Saxton introduced H.R. 1834. The bill was referred to the Committee on Science and Technology, and in addition to the Committee on Natural Resources and the Committee on Armed Services.

On October 10, 2007, the Subcommittee on Energy and Environment met to consider H.R. 1834. No amendments were offered. The Subcommittee ordered the bill to be reported to the Committee by voice vote.

The Committee met to consider H.R. 1834 on October 24, 2007. Representative Lampson offered a manager's amendment, which was adopted by a voice vote. The Committee ordered the measure reported, as amended, by a voice vote. On December 18, 2007, the Committee reported H.R. 1834 to the House (H.Rept. 110-311, Part 2). The House suspended the rules and passed H.R. 1834 on a recorded vote of 352-49 on February 14, 2008.

On February 25, 2008, H.R. 1834 was received in the Senate and placed on the Senate Legislative Calendar under General Orders. No further legislative action was taken on H.R. 1834.

2.16—H.R. 1867, NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT OF 2007

Background and Summary of Legislation

The National Science Foundation (NSF) is an independent federal agency created by the *National Science Foundation Act of 1950* (P.L. 81-507). NSF's mission is unique among the Federal Government's scientific research agencies in that it is to support science and engineering across all disciplines. NSF funds research and education activities at more than 2,000 universities, colleges, K-12 schools, businesses, and other research institutions throughout the United States. Virtually all of this support is provided through competitive, merit-reviewed grants and cooperative agreements. Although NSF's research and development budget accounts for only about three percent of all federally funded research, the role of NSF in promoting fundamental research is vital to the Nation's scientific enterprise, as NSF provides approximately 20 percent of the federal support for basic research conducted at academic institutions.

Basic research pays enormous dividends to society. Economic growth, public health, national defense, and social advancement have all been tied to technological developments resulting from research and development. In fact, economists estimate that innovation and the application of new technology have generated at least half of the phenomenal growth in America's gross domestic product

since World War II. In recent years, NSF-funded research in areas such as nanotechnology, information technology, computing, genetics, and climate has had a tremendous impact on society.

While the Administration's American Competitiveness Initiative (ACI) brought greater recognition and more money for NSF in fiscal year (FY) 2007, funding for NSF was stagnant for several years prior to ACI, and NSF needs to see steady growth over the long-term to maximize the agency's potential contribution to the Nation's research enterprise. NSF is currently able to fund only about 25 percent of the grant proposals submitted because of limited funds; in some directorates, the percentage of grant proposals funded is as low as 10 percent. More funding for basic science is needed to feed the innovation pipeline and to ensure future economic growth, as well as to strengthen homeland defense and national security.

NSF was most recently authorized by the *National Science Foundation Act of 2002* (P.L. 107-368), which authorized appropriations for NSF for FY 2003 through FY 2007. In addition to continuing authorizations of appropriations for three more years, several policy and administrative issues—including ones related to the Foundation's responsibilities for funding major research instrumentation at universities, for mentoring postdoctoral research associates, for reporting research results, for funding science, technology, engineering and mathematics (STEM) education programs, and for implementing responsible and clear cost-sharing guidelines have arisen since the last authorization bill.

The purpose of H.R. 1867 was to authorize appropriations for fiscal years 2008, 2009 and 2010 for the National Science Foundation and to impose requirements related to: major research instrumentation funded by the Foundation; application of merit review criteria used by the Foundation; mentoring and ethics training for students and postdoctoral research associates funded under Foundation grants; and reporting on allocation of funds for education and human resources activities supported by the Foundation.

Legislative History

H.R. 1867 was introduced by Representative Baird on April 17, 2007. The bill was referred to the Committee on Science and Technology.

The Subcommittee on Research and Science Education met to consider H.R. 1867 on April 19, 2007. Representative Baird, on behalf of Representative Johnson, offered two amendments, which were adopted by voice vote. An amendment offered by Representative Hooley was also adopted by voice vote. The bill, as amended, was reported to the Committee by voice vote.

The Committee met to consider H.R. 1867 on April 25, 2007. A manager's amendment offered by Representative Baird, an amendment offered by Representative Hall, and an amendment offered by Representative Gingrey passed on separate voice votes. The Committee voted by voice vote to report the bill, as amended, to the House. H.R. 1867 was reported to the House on April 30, 2007 (H.Rept. 110-114). On May 2, 2007, the House considered H.R. 1867. The bill passed, as amended, by a recorded vote of 399-17.

H.R. 1867 was received in the Senate on May 3, 2007. No further legislative action took place on H.R. 1867.

The text of H.R. 1867 was incorporated in Title VII of H.R. 2272, the *America COMPETES Act*. H.R. 1868 was signed into law as P.L. 110–69 on August 9, 2007.

2.17—H.R. 1868, TECHNOLOGY INNOVATION AND MANUFACTURING STIMULATION ACT OF 2007

Background and Summary of Legislation

Founded in 1901, the National Institute of Standards and Technology (NIST) has developed and promoted measurement, standards, and technology to enhance productivity, facilitate trade, and improve quality of life. NIST is a non-regulatory agency of the U.S. Commerce Department's Technology Administration. The institution operates in two primary locations: Gaithersburg, MD and Boulder, CO. It also operates two institutes jointly with other organizations: the Center for Advanced Research in Biotechnology in Rockville, MD (with the University of Maryland) and JILA in Boulder, CO (with the University of Colorado). NIST's staff includes approximately 2,700 scientists, engineers, technicians, and support personnel. In addition, 1,800 associates complement the staff, and NIST partners with about 1,500 manufacturing specialists and staff at affiliated centers around the country. Three NIST scientists have earned the Nobel Prize in the last ten years.

NIST carries out its mission through four cooperative programs: the Baldrige National Quality Program, the Manufacturing Extension Partnership (MEP), the Advanced Technology Program (ATP), and a program that develops tools to measure, evaluate, and standardize, enabling U.S. companies to innovate and remain competitive. In addition, NIST operates two national research facilities: the NIST Center for Neutron Research and the Center for Nanoscale Science and Technology.

NIST's last comprehensive authorization was by the *American Technology Preeminence Act of 1991* (Public Law 102–245), which authorized all of NIST's programs for fiscal years 1992 and 1993 (FY 1992 and FY 1993). A portion of NIST was authorized by the *Technology Administration Act of 1998* (P.L. 105–309), which authorized only the laboratory programs of the Institute for FY 1998 and FY 1999. Since those bills, NIST submitted legislative authorization requests to Congress (most recently in 2002) and completed a major laboratory upgrade at its Gaithersburg, MD campus (the Advanced Metrology Laboratory). It also embarked on laboratory upgrades to its Boulder, CO campus and requested funds for upgrades to the Center for Neutron Research. In FY 2007 the NIST budget request included significant increases for its laboratory activities.

The purpose of H.R. 1868 was to authorize appropriations for FY 2008–2010 for NIST and to require a triennial planning document for the Institute; to establish advisory boards for the Institute's two industrial technology programs; to create manufacturing science grant programs and research fellowships; to create a new technology innovation program; and to make technical corrections to the NIST statute.

Legislative History

On February 15, 2007, H.R. 1868 was introduced by Representative Wu. The bill was referred to the Committee on Science and Technology.

On April 19, 2007, the Subcommittee of Technology and Innovation met to consider H.R. 1868. Representatives Wu and Gingrey offered a joint technical amendment, which was agreed to by a voice vote. Representative Matheson offered an amendment, which was also agreed to by a voice vote. The Subcommittee ordered the measure reported, as amended, to the Committee by a voice vote.

On April 25, 2007, the Committee met to consider H.R. 1868. Representative Biggert offered an amendment, which was agreed to by a voice vote. An amendment offered by Representative Gingrey was also adopted by a voice vote. Finally, an amendment offered by Representatives Johnson and Gingrey was agreed to by voice vote. The Committee ordered the measure reported, as amended, by a voice vote. The Committee reported the bill to the House on April 30, 2007 (H.Rept. 110–115). On May 3, 2007, the House considered H.R. 1868. The bill, as amended, passed by a recorded vote of 385–23.

On May 7, 2007, the Senate received H.R. 1868 and referred the bill to the Committee on Commerce, Science, and Transportation. No further legislative action was taken on H.R. 1868.

This bill was subsequently included in Title VII of H.R. 2272, the *America COMPETES Act*. H.R. 2272 was signed into law as P.L. 110–69 on August 9, 2007.

2.18—H.R. 1933, DEPARTMENT OF ENERGY CARBON CAPTURE AND STORAGE RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACT OF 2007

Background and Summary of Legislation

Approximately 50 percent of the electricity generated in the United States comes from coal. According to the Department of Energy’s Energy Information Administration (EIA) carbon dioxide emissions in the United States and its territories were 6,008.6 million metric tons (MMT) in 2005. In the United States, most anthropogenic carbon dioxide (CO₂) is emitted as a result of the combustion of fossil fuels. In particular, the electric power sector accounts for nearly 40 percent of the man made CO₂ emissions in the U.S., according to EIA. For the foreseeable future, the U.S. will continue to rely on coal to meet our energy demand. With that understanding, the challenge lies in balancing our environmental goals with our energy needs. The Massachusetts Institute of Technology (MIT) report *The Future of Coal* (2007) concludes “that CO₂ capture and sequestration is the critical enabling technology that would reduce CO₂ emissions significantly while also allowing coal to meet the world’s pressing energy needs.”

Crafting a Carbon Capture and Storage (CCS) strategy for the United States calls for an understanding of the technical challenges that exist with the development, demonstration and deployment of carbon dioxide capture technologies and the development of safe, effective large-scale containment of carbon dioxide. Appropriate investment in continued research is necessary to answer outstanding

concerns with large-volume storage of CO₂ in underground reservoirs.

The Department of Energy has produced an Atlas of the CO₂ storage capacity in the United States and Canada. This Atlas will be updated as the Department continues to conduct field injection tests. Sequestration demonstrations will help to address the outstanding safety and environmental issues associated with large underground reservoirs of carbon dioxide. Once the CO₂ is injected, do we have the capability of successfully monitoring and verifying the movement of the subsurface CO₂? The demonstrations will provide greater information about the probability of the CO₂ leaking, the ability to detect a leak, how the CO₂ would leak and how fast it would leak. Ultimately, the goal is to determine with increased certainty the measurable benefits of CCS strategies to reduce emissions of heat-trapping gases.

There is also recognition that additional federal investment in carbon dioxide capture technologies is needed to bring these technologies to full-scale deployment. The MIT Report points out that there is no operational experience with carbon capture from coal plants and notes the absence of operational experience with an integrated capture and sequestration system. The MIT report states that “the priority objective with respect to coal should be the successful large-scale demonstration of the technical, economic, and environmental performance of the technologies that make up all of the major components of a large-scale integrated CCS system—capture, transportation and storage.”

The purpose of the H.R. 1933 was to amend the *Energy Policy Act of 2005* to reauthorize and improve the carbon capture and storage research, development, and demonstration program of the Department of Energy. H.R. 1933 followed the recommendation in the MIT report and reauthorized the Department of Energy’s research and development and field testing programs, and specifically authorized large-scale demonstrations of both carbon dioxide capture technologies and carbon dioxide containment.

Legislative History

On April 18, 2007, Representative Udall introduced H.R. 1933. The bill was referred to the Committee on Science and Technology.

On June 21, 2007, the Subcommittee on Energy and Environment met to consider H.R. 1933. Representative Udall and Representative Costello each proposed amendments which were both adopted by a voice vote. The Subcommittee ordered the measure, as amended, to be reported to the Committee by voice vote.

On June 27, 2007, the Committee met to consider H.R. 1933. Representative Udall, Representative Matheson, Representative Ross and Representative Johnson each offered amendments and all of them were adopted by separate voice votes. Representative McCaul offered an amendment which was defeated by a recorded vote of 15–22. The Committee voted by voice vote to report the bill, as amended, to the House. On August 2, 2007, H.R. 1933 was reported to the House (H.Rept. 110–301). No further legislative action was taken on H.R. 1933.

The bill text of H.R. 1933 was ultimately included in Title VII of H.R. 6, the *Energy Independence and Security Act of 2007*. H.R. 6 was signed into law as P.L. 110–140 on December 19, 2007.

2.19—H.R. 2304, ADVANCED GEOTHERMAL ENERGY RESEARCH AND DEVELOPMENT ACT OF 2007

Background and Summary of Legislation

Geothermal energy is heat from the Earth's core that is trapped in the Earth's crust. It can be tapped and used either to generate electricity or for direct use (e.g., heating buildings, greenhouses, or aquaculture operations). It is very attractive as an energy resource because it is not only renewable and emits no greenhouse gases, but can also provide continuously dispatchable, baseload power, day and night, 365 days a year. Geothermal energy is also a domestic resource, creating domestic jobs and increasing national security.

In locations where high temperatures coincide with naturally-occurring, underground, fluid-filled reservoirs, the resulting hot water or steam can be tapped directly to run a geothermal power plant. Such locations are referred to as hydrothermal (hot water) resources, and they have been the focus of traditional geothermal energy development. The United States is the world's largest producer of electric power from geothermal energy with approximately 2,800 megawatts (MW) of geothermal electrical generating capacity currently connected to the grid, mostly in California and the Intermountain West, where high grade hydrothermal systems have been found close to the surface. However, significant hydrothermal potential remains untapped. The U.S. Geological Survey (USGS) estimates there are between 95,000 MW and 127,000 MW of hydrothermal resources sufficient for electrical power generation in the United States, though many of these resources remain undiscovered and unconfirmed, as they are in locations without obvious surface manifestations.

Even that large number, however, pales in comparison to the potential of Enhanced Geothermal Systems (EGS). EGS differ from hydrothermal systems in that they lack either a natural reservoir (i.e., the cracks and spaces in the rock through which fluid can circulate), the fluid to circulate through the reservoir, or both. In EGS development, sometimes referred to as 'heat mining,' an injection well is drilled to a depth where temperatures are sufficiently high; if necessary, a reservoir is created, or 'cracked,' in the rock using one of various methods to apply pressure; and a fluid is introduced to circulate through the reservoir and absorb the heat. The fluid is extracted through a production well, the heat is used to run a geothermal power plant or for some direct use application and the fluid is re-injected to start the loop all over again.

Although it has been the subject of preliminary investigations in the United States, Europe, and Australia, the EGS concept has yet to be demonstrated as a commercially viable source of power production. However, experts familiar with the resource and the associated technologies believe the technical and economic hurdles are surmountable. In January 2007, a panel led by the Massachusetts Institute of Technology produced a report entitled *The Future of*

Geothermal Energy, which contained an updated assessment of EGS potential in the United States. The authors of the report conservatively estimate that two percent of the EGS resource could be economically recoverable—an amount more than 2,000 times larger than all the primary energy consumed in the United States in 2005.

To develop technologies capable of tapping lower grade resources in particular, further research and development in both hydrothermal and EGS is essential. H.R. 2304 was intended to reinvigorate geothermal energy R&D in the United States in order to unlock the potential of this vast resource, across the full spectrum of grades, for the benefit of the Nation.

Legislative History

On May 14, 2007, Representative McNerney introduced H.R. 2304. The bill was referred to the Committee on Science and Technology.

On June 6, 2007, the Subcommittee on Energy and Environment met to consider H.R. 2304. An amendment offered on behalf of Representative McNerney was adopted by a voice vote. The Subcommittee ordered the measure, as amended, to be reported to the Committee by a voice vote.

On June 13, 2007, the Committee met to consider H.R. 2304. An amendment offered on behalf of Representative Hall was agreed to by voice vote. Representative Bartlett proposed three amendments which were adopted, en bloc, by voice vote. Representative McCaul proposed two amendments which were adopted, en bloc, by voice vote. An amendment offered by Representative Biggert was also adopted by voice vote. Representative Biggert proposed another amendment that was defeated by voice vote, and Representative Matheson proposed an amendment that was withdrawn. The Committee ordered the measure, as amended, reported by a voice vote. On June 21, 2007 the Committee reported H.R. 2304 to the House (H.Rept. 110–203). No further legislative action was taken on H.R. 2304.

This bill text of H.R. 2304 was generally incorporated in Title VII of H.R. 6, the *Energy Independence and Security Act of 2007*. H.R. 6 was signed into law as P.L. 110–140 on December 19, 2007.

2.20—H.R. 2313, MARINE RENEWABLE RESEARCH AND DEVELOPMENT ACT OF 2007

Background and Summary of Legislation

Moving water contains a high energy concentration, measured in watts per meter (for waves) or watts per square meter (for tides and currents), compared with other renewable energy resources, such as wind and solar. This creates an opportunity to extract comparable amounts of energy with a smaller apparatus. Other benefits of marine renewable energy include: the vast size of the resource—the Electric Power Research Institute has estimated that marine renewables could provide 10 percent of United States electricity needs; no fuel costs; the fact that it is a non-emitting, predictable domestic resource—waves can be predicted as far as three days in advance, and all other marine renewables can be predicted

indefinitely into the future; and the low profile nature of devices for marine energy, which makes them unlikely to incur opposition on aesthetic grounds.

The challenge lies in developing technologies to effectively and efficiently harness the energy contained in ocean movement or thermal gradients. The potential of marine renewable energy technologies has been debated for many years, but they now appear poised for a technological breakthrough. Prototypes or small pilot installations have recently been installed and hooked into the power grid in Australia, Portugal, the United Kingdom, and the United States.

H.R. 2313 provided federal support for research, development, demonstration, and commercial application of marine renewable energy technologies to ensure that U.S. companies have the support they need to bring their technologies to commercial viability and can be competitive in this emerging global market. The bill also provided support to ensure that emerging technologies are developed in an environmentally sensitive way. Finally, the bill instructed the Secretary to establish one or more National Centers for Marine Renewable Energy Research, Development, and Demonstration facilities where researchers and developers of marine renewable energy technologies could easily research and test their technologies in a facility at an environmentally screened location with an established grid connection.

Legislative History

On May 15, 2007, Representative Hooley introduced H.R. 2313. The bill was referred to the Committee on Science and Technology.

On June 6, 2007, the Subcommittee on Energy and Environment met to consider H.R. 2313. Representative Lampson proposed an amendment, which was adopted by a voice vote. The Subcommittee ordered the measure, as amended, to be reported to the Committee by a voice vote.

On June 13, 2007, the Committee met to consider H.R. 2313. Representative Hooley proposed an amendment, Representative Diaz-Balart proposed two amendments, Representative Bartlett proposed an amendment, Representative Hall proposed an amendment, Representative Gingrey proposed an amendment, and Representative Akin proposed an amendment, all of which were adopted by voice vote. Representative Smith proposed an amendment that was withdrawn. The Committee ordered the measure, as amended, reported by a voice vote. On June 21, 2007, the Committee favorably reported H.R. 2304 to the House (H.Rept. 110–202). No further legislative action was taken on H.R. 2313.

The bill text of H.R. 2313 was generally incorporated in Title VII of H.R. 6, the *Energy Independence and Security Act of 2007*. H.R. 6 was signed into law as P.L. 110–140 on December 19, 2007.

2.21—H.R. 2339, PRODUCED WATER UTILIZATION ACT OF 2007

Background and Summary of Legislation

As the population of the United States increases, additional potable water supplies are required to sustain individuals, agricultural

production, and industrial users, particularly in the Mountain West and desert Southwest. During the development of domestic energy sources, including coal-bed methane, oil, and natural gas, water may be extracted from underground sources and brought to the surface, often increasing energy production from subsurface geological formations in the process. Produced water frequently contains increased levels of potentially harmful dissolved solids, rendering much of the water non-potable and unsuitable for agricultural or industrial uses, and encouraging re-injection of the water to subsurface geological formations to safely dispose of it. This may lead to reduced production of domestic energy resources and increased costs to producers.

The environmentally responsible surface utilization of produced water would increase water supply, reduce the amount of produced water returned to underground formations, and increase domestic energy production by reducing costs associated with re-injection of produced water to the subsurface. At a time when usable water supplies are more vital than ever to support our growing economy, safe and sustainable uses of produced water need to be researched and pursued, for human, agricultural and industrial uses. This legislation addressed environmental concerns, water use issues and energy production benefits.

H.R. 2339 directed the Secretary to establish a program of research, development, and demonstration of technologies for environmentally sustainable utilization of produced water for irrigational, municipal, and industrial uses, authorizing \$20 million each year for fiscal years 2009 through 2013. The program addressed produced water recovery, produced water utilization and re-injection of produced water. The program also established a complementary R&D program at the appropriate DOE National Laboratory.

Legislative History

On May 16, 2007, Representative Hall, Ranking Member of the Committee on Science and Technology, introduced H.R. 2339. The bill was referred to the Committee on Science and Technology.

The Subcommittee on Energy and Environment met to consider H.R. 2339 on May 6, 2008. Representative Hall offered an amendment in the nature of a substitute, which was agreed to by voice vote. The bill, as amended, was reported favorably to the Committee by voice vote.

The Committee met to consider H.R. 2339 on July 16, 2008. No amendments were offered. The Committee voted by voice vote to report the bill, as amended in Subcommittee, to the House. On July 30, 2008, the Committee reported H.R. 2339 to the House (H.Rept. 2339). On July 30, 2008, the House suspended the rules and passed H.R. 2339 by voice vote.

On July 31, 2008, H.R. 2339 was received in the Senate and referred to the Energy and Natural Resources Committee. No further legislative action was taken on H.R. 2339.

2.22—H.R. 2342, NATIONAL INTEGRATED COASTAL AND OCEAN OBSERVATION ACT OF 2007

Background and Summary of Legislation

H.R. 2342 directed the President to establish a National Integrated Coastal and Ocean Observation System to: (1) support national defense, marine commerce, energy production, basic and applied research, ecosystem-based marine and coastal resource management, public safety and public outreach training and education; (2) promote awareness of ocean, coastal, and Great Lakes resources; (3) improve the ability to measure, track, explain, and predict weather and climate change and natural climate variability; (4) fulfill the plan contained in the document entitled “Ocean.US Publication No. 9, The First Integrated Ocean Observing System (IOOS) Development Plan”; and (5) fulfill the Nation’s international obligations to contribute to the global Earth and ocean observation systems.

The bill made the National Ocean Research Leadership Council responsible for coordination and long-term operations plans, policies, protocols, and standards for the System and for coordination with other Earth observing activities.

It made the existing Interagency Working Group responsible for, among other things, implementation of operations plans and policies, budget development, identification of observation coverage gaps or capital improvements needs, data management and communication protocols and standards, observation data variables, and establishment of a competitive matching grant or other program to promote research and development of innovative observation technologies.

It made the Administrator of the National Oceanic and Atmospheric Administration (NOAA) the lead federal agency for the System.

Legislative History

On May 16, 2007, Representative Allen introduced H.R. 2342. The bill was referred the Committee on Natural Resources, and the Committee on Science and Technology.

On March 31, 2008, the Committee discharged H.R. 2342. On March 31, 2008, the House suspended the rules and passed H.R. 2342 by voice vote.

On April 1, 2008, H.R. 2342 was received in the Senate and referred to the Committee on Commerce, Science, and Transportation. No further legislative action was taken on H.R. 2342.

2.23—H.R. 2400, OCEAN AND COASTAL MAPPING INTEGRATION ACT

Background and Summary of Legislation

H.R. 2400 directed the Administrator of the National Oceanic and Atmospheric Administration (NOAA) to establish an integrated ocean and coastal mapping program for the Great Lakes and coastal State waters, the territorial sea, the exclusive economic zone, and the U.S. continental shelf that enhances ecosystem approaches in decision-making for conservation and management of marine re-

sources and habitats, established research priorities, supported the siting of research and other platforms, advanced safety of navigation, and advanced ocean and coastal science.

The bill directed the Administrator to convene or use an existing interagency committee on ocean and coastal mapping to implement such program and to coordinate federal ocean and coastal mapping and surveying activities with other federal efforts (including the Digital Coast, Geospatial One-Stop, and the Federal Geographic Data Committee), international mapping activities, coastal states, user groups, and non-governmental entities. It also authorized the Administrator to convene an ocean and coastal mapping advisory panel consisting of representatives from non-governmental entities to provide input regarding activities of the committee.

It also directed the Administrator to develop a plan for an integrated ocean and coastal mapping initiative within NOAA that: (1) identifies all ocean and coastal mapping programs within NOAA, establishing priorities; (2) encourages the development of innovative ocean and coastal mapping technologies and applications through research and development (R&D) cooperative agreements at joint or cooperative research institutes or centers and with other non-governmental entities; and (3) documents available and developing technologies, best practices in data processing and distribution, and leveraging opportunities with other federal agencies, coastal states, and non-governmental entities.

It authorized the Administrator to establish joint ocean and coastal mapping centers (including a joint hydrographic center) of excellence in institutions of higher education to conduct specified activities, including: (1) research and development of innovative ocean and coastal mapping technologies, equipment, and data products; and (2) mapping of the U.S. outer continental shelf.

Legislative History

On May 21, 2007, Representative Bordallo introduced H.R. 2400. The bill was referred to the Committee on Natural Resources, and the Committee on Science and Technology.

On July 23, 2007, the Committee discharged H.R. 2400. On July 23, 2007, the House suspended the rules and passed H.R. 2400 by voice vote.

On July 24, 2007, H.R. 2400 was received in the Senate and referred to the Committee on Commerce, Science, and Transportation. No further legislative action was taken on H.R. 2400.

2.24—H.R. 2406, HEALTHCARE INFORMATION TECHNOLOGY ENTERPRISE INTEGRATION ACT

Background and Summary of Legislation

While many sectors of the U.S. economy have fully integrated information technology (IT) into their operations, the U.S. health care system continues to rely on pen and paper for the bulk of its information needs. This system is costly, antiquated, and prone to dangerous or life-threatening medical errors. More than 98,000 Americans die and more than one million patients suffer injuries each year as a result of broken health care practices and system failures. According to the National Academies, between 30 and 40

percent of health care costs—more than half a trillion dollars per year—is spent on ‘overuse, under-use, misuse, duplication, system failures, and unnecessary repetition, poor communication, and inefficiency.’ In addition, the lack of integrated, inter-operable electronic health care records (EHRs) means that, in our health care system, patients themselves must act as their own comprehensive health care record which often adds additional error in treatment.

IT offers enormous potential benefits to improve the functioning and efficiency of U.S. health care. A fully realized inter-operable health care IT system could reduce errors, improve communication, help eliminate redundancy, and provide numerous other benefits that would protect patients and save up to tens of billions of dollars per year. The central challenge to achieving such a system is inter-operability—the ability of data systems, medical devices, and software from different vendors based on a diverse array of platforms to share patient EHRs, electronic physician orders for lab tests and drug prescriptions, electronic referrals to specialists, electronic access to information about current recommended treatments and research findings, and other information. Data security and privacy requirements present additional challenges, as electronic systems must comply with federal and State laws mandating patient privacy.

The provisions of H.R. 2406 are based on recommendations in a 2004 report from the President’s IT Advisory Committee entitled “*Revolutionizing Health Care through Information Technology*,” and a 2005 report from the National Academies entitled “*Building a Better Delivery System*.”

The purpose of H.R. 2406 was to establish an initiative for health care information enterprise integration at the National Institute of Standards and Technology (NIST). It directed NIST to work with the private sector to establish technical standards for health care IT for federal agencies that will promote the inter-operability of federal health care information systems. It created a program of grants to universities and consortia to conduct multi-disciplinary research in health care IT research centers, directed the National High-Performance Computing Program to coordinate federal research and development programs related to health care IT, and further directed NIST to establish a task force to develop recommendations on standards harmonization. Finally, it authorized \$8 million for NIST in FY 2009 and FY 2010.

Legislative History

On May 21, 2007, Representative Gordon, Chairman of the Committee on Science and Technology, introduced H.R. 2406. The bill was referred to the Committee on Science and Technology.

On October 24, 2007, the Committee met to consider H.R. 2406. Representative Gordon offered an amendment, which was adopted by a voice vote. Representative Hill offered an amendment, which passed by a vote of 21–13. Representative Gingrey offered an amendment, which failed by a vote of 13–20. The measure, as amended, was ordered reported by voice vote. On November 15, 2007, the Committee reported the bill to the House (H.Rept. 110–451). No further legislative action was taken on H.R. 2406.

2.25—H.R. 2698, FEDERAL AVIATION RESEARCH AND DEVELOPMENT AUTHORIZATION ACT OF 2007

Background and Summary of Legislation

The Federal Aviation Administration (FAA) was created to develop the Nation's air commerce system and promote aviation safety. As part of the Airport Development and Airway Trust Fund established by Congress in 1982, a comprehensive research and development program was put in place to maintain a safe and efficient air transportation system. In 2003, Congress passed *Vision 100—Century of Aviation Reauthorization Act* [P.L. 108–176] that authorized funding for FAA's activities, including research and development, for fiscal years 2003 through 2007. P.L. 108–176 also established the Next Generation Air Transportation System's Joint Planning and Development Office (JPDO) in Title VII—Aviation Research, to manage work related to planning, research, development, and creation of a transition plan for the implementation of the Next Generation Air Transportation System.

The purpose of H.R. 2698 was to reauthorize appropriations for the Federal Aviation Administration's research and development programs for fiscal years 2008, 2009, 2010, and 2011 and to clarify responsibilities and activities of the Next Generation Air Transportation System's Joint Planning and Development Office; amend provisions related to FAA's Centers of Excellence; establish an interagency initiative on the impact of aviation on the climate; authorize a runway research program; extend the Airport Cooperative Research Program; and authorize a number of other R&D initiatives. The funds authorized by this Act were aimed at improving the safety, capacity, and efficiency of the Nation's air transportation system to meet expected air traffic demands of the future.

Legislative History

On June 13, 2007, Representative Udall introduced H.R. 2698. The bill was referred to the Committee on Science and Technology.

On June 14, 2007, the Subcommittee on Space and Aeronautics met to consider H.R. 2698. No amendments were offered. The Subcommittee ordered the measure to be reported to the Committee by a voice vote.

On June 22, 2007, the Committee met to consider H.R. 2698. Representative Gordon offered an amendment, Representative Chandler offered an amendment, and Representative Matheson offered an amendment, each of which were adopted by voice vote. Representative Rothman offered an amendment which was withdrawn. The Committee ordered the measure, as amended, reported by a voice vote. The bill was reported to the House on September 17, 2007 (H.Rept. 110–329). No further legislative action was taken on H.R. 2698.

This bill text of H.R. 2698 was generally incorporated into H.R. 2881, the *FAA Reauthorization Act of 2007*. H.R. 2881 passed the House on September 20, 2007, but no further legislative action was taken on the measure.

2.26—H.R. 2773, BIOFUELS RESEARCH AND DEVELOPMENT ENHANCEMENT ACT

Background and Summary of Legislation

The purpose of H.R. 2773 was to enhance research, development, demonstration, and commercial application of biofuels related technologies and promote a greater degree of federal coordination of research and development materials related to biofuels.

High gasoline prices, a desire to reduce our dependence on foreign sources of energy, and concerns over climate change have greatly increased interest in bio-based fuels as an alternative to petroleum for transportation fuel. Over the last several years, in part as a result of the Renewable Fuel Standard included in the *Energy Policy Act of 2005*, the use of biofuels—most notably corn-based ethanol—has grown significantly. Ethanol is most commonly blended with gasoline at a level of 10 percent or less. And, this still only represents a small portion (less than five percent) of the total gasoline sold.

Proposals in Congress and by the Administration have called for significant increases in the use of biofuels. Currently biofuel supply relies almost exclusively on corn-based ethanol. Concerns have been raised about further expansion of corn-based ethanol to meet the targets set for biofuel production. Competition with food and feed supply, water and nutrient demand associated with corn production, and continued questions about the energy balance of corn-based ethanol production all suggest that biomass sources for biofuel production must be diversified.

The majority of this focus to diversify the feedstocks has been on cellulosic materials including grasses, wood, and waste materials. However, current technologies for the development of fuel from these sources continue to be expensive and not cost-competitive with corn-based ethanol. If we are going to move toward broader use of biofuels, technology will be necessary to create reasonably priced fuels from cellulosic materials.

The *Agricultural Risk Protection Act of 2000* (Title III), the *Farm Security and Rural Investment Act of 2002*, and the *Energy Policy Act of 2005* created bioenergy research and development programs to focus federal research funding on the development of biofuels derived from cellulosic materials. This research is ongoing and operates under a Memorandum of Understanding between the Department of Energy and the Department of Agriculture.

H.R. 2773 expanded federal biofuels research efforts and authorized several studies to provide necessary information to the Committee that will allow the Committee to make additional research commitments in the future. More specifically, the bill attempted to better coordinate and compile information from federal biofuels research programs, focus some of the biofuels research on infrastructure needs and efficiency of biorefineries, study some of the continuing challenges facing broader use of biofuels, and increase the funding levels for Department of Energy biofuels research.

Legislative History

H.R. 2773 was introduced by Representative Lampson on June 19, 2007. The bill was referred to the Committee on Science and Technology.

The Subcommittee on Energy and Environment met to consider H.R. 2773 on June 21, 2007. A manager's amendment offered by Representative Lampson was agreed to by voice vote. An amendment offered by Representatives Woolsey and Bartlett was agreed to by voice vote. The Subcommittee voted by voice vote to report the bill, as amended, to the Committee.

The Committee met to consider H.R. 2773 on June 27, 2007. The Committee considered 11 amendments to H.R. 2773. A manager's amendment offered by Representative Gordon was agreed to by voice vote. An amendment offered by Representative Hall was defeated on a recorded vote of 12–20. An amendment offered by Representative Hall was agreed to by voice vote. An amendment offered by Representative Matheson was agreed to by voice vote. An amendment offered by Representative Biggert was agreed to by voice vote. An amendment offered by Representative Bartlett and Representative Woolsey was agreed to by voice vote. An amendment offered by Representative Hill was agreed to by voice vote. An amendment offered by Representative Bartlett was agreed to by voice vote. An amendment offered by Representative Lampson was agreed to by voice vote. An amendment offered by Representatives Smith of Nebraska and Lampson was agreed to by voice vote. An amendment offered by Representative Smith of Nebraska was defeated on a recorded vote of 11–17. The Committee voted to report the bill, as amended, to the House by voice vote. On August 3, 2007, H.R. 2773 was reported to the House (H.Rept. 2773). No further legislative action was taken on H.R. 2773.

The bill text of H.R. 2773 was generally incorporated in various sections of H.R. 6, *Energy Independence and Security Act of 2007*. H.R. 6 was signed into law as P.L. 110–130 on December 19, 2007.

2.27—H.R. 2774, SOLAR ENERGY AND ADVANCEMENT ACT OF 2007

Background and Summary of Legislation

The first two components of H.R. 2774 were specifically related to concentrating solar power (CSP). A 2006 report by the Western Governors' Association assessed the overall near-term potential for CSP capacity in the American Southwest, taking into account areas of high solar ray intensity, near-level land, non-sensitivity to CSP use, and proximity to transmission. The resulting set of potential plant sites totaled 200 GW of potential power production. To put this in perspective, the electric generating capacity of the entire United States is currently about 1,000 GW. Some significant challenges remain to widespread implementation of CSP, however.

CSP plants produce electric power by converting the sun's energy into high-temperature heat using various mirror configurations. The heat is then channeled through a conventional generator. These plants consist of two parts: one that collects solar energy and converts it to heat, and another that converts heat energy to electricity. Thermal energy storage technology allows this heat to be

retained for later use in generating electricity, such as during periods of passing clouds or into the evening. The *Energy Policy Act of 2005* established a CSP research and development program, but storage was not included in the language. H.R. 2774 established a program dedicated to advancing research and development in thermal energy storage for CSP, authorizing \$5 million for this program in FY08, and steadily increasing to \$12 million in FY12.

The bill also tasked the Department of Energy (DOE) with conducting two studies: (1) one on methods to integrate concentrating solar power with regional electricity transmission systems, and to identify new transmission or transmission upgrades needed to bring electricity from high concentrating solar power resource areas to growing electric power load centers throughout the United States; and (2) one on methods to reduce the amount of water consumed by concentrating solar power systems, given the strain on water resources in the Southwest.

The third component of H.R. 2774 addressed the solar industry in general. Having a certified, well-trained workforce to install and maintain solar energy products is critical to the success of the industry. H.R. 2774 created such a program, authorizing \$10 million in each year from FY08 through FY12. The bill instructed DOE to ensure sufficient geographic distribution of training programs nationally, and to only award grants for programs certified by the Institute of Sustainable Power or equivalent industry-accepted quality-control certification institution, or for new and growing programs with a credible path to certification.

Legislative History

On June 19, 2007, Representative Giffords introduced H.R. 2774. The bill was referred to the Committee on Science and Technology.

On June 21, 2007, the Subcommittee on Energy and Environment met to consider H.R. 2774. Representative Giffords offered an amendment, which was adopted by a voice vote. The Subcommittee ordered the measure, as amended, to be reported to the Committee by a voice vote.

On June 27, 2007, the Committee met to consider H.R. 2774. Representative Bartlett offered two amendments, Representative Johnson offered three amendments, Representative Hall (on behalf of Representative Smith of Texas) offered an amendment, and Representative Wu offered an amendment, all of which were adopted by voice vote. Representative Inglis offered an amendment that was defeated on a recorded vote of 7–17. Representative Hall offered an amendment that was withdrawn. The Committee ordered the measure reported, as amended, by a voice vote. On August 3, 2007 the Committee favorably reported H.R. 2774 to the House (H.Rept. 110–303). No further legislative action was taken on H.R. 2774.

The bill text of H.R. 2774 was generally incorporated in H.R. 6, *Energy Independence and Security Act of 2007*. H.R. 6 was signed into law as P.L. 110–140 on December 19, 2007.

2.28—H.R. 2850, GREEN CHEMISTRY RESEARCH AND DEVELOPMENT ACT OF 2007

Background and Summary of Legislation

Chemical manufacturing can result in harm to human health and the environment due to the usage of hazardous materials and the generation of dangerous byproducts. Green chemistry seeks to mitigate harmful outcomes by using safer materials and manufacturing processes. By considering chemical hazards in the design of products and processes, chemists can design chemicals to be safe, just as they can design them to have other properties. For example, one positive green chemistry was the development of pesticide alternatives that are effective at killing target organisms, but are benign to non-target organisms and do not persist in the environment.

The Federal Government supports activities related to green chemistry through agencies including the National Science Foundation (NSF), the Environmental Protection Agency (EPA), the Department of Energy (DOE) and the National Institute of Standards and Technology (NIST). Some agencies, such as EPA, run programs that are focused directly on green chemistry. Other agencies, such as DOE, fund green chemistry as byproducts of efforts to achieve other goals, such as improving energy efficiency.

The purpose of H.R. 2850 is to focus and to integrate the Federal Government's green chemistry R&D activities, and to make them a higher priority. The legislation is also designed to increase education and training in green chemistry.

Legislative History

On June 25 2007, Representative Gingrey introduced H.R. 2850. The bill was referred to the Committee on Science and Technology.

On July 11, 2007, the Committee met to consider H.R. 2850. An amendment offered by Representative Lipinski was adopted by voice vote. An amendment offered by Representative Johnson was also adopted by a voice vote. The bill was ordered to be reported, as amended, by voice vote. On September 4, 2007, the House suspended the rules and passed H.R. 2850 by voice vote.

On September 5, the bill was received in the Senate and referred to the Committee on Commerce, Science, and Transportation. No further legislative action was taken on H.R. 2850.

2.29—H.R. 3775, INDUSTRIAL ENERGY EFFICIENCY RESEARCH AND DEVELOPMENT ACT OF 2007

Background and Summary of Legislation

The Energy Efficiency and Renewable Energy's (EERE) Industrial Technologies Program (ITP) at the Department of Energy (DOE), works to improve the energy intensity of U.S. industry through coordinated research and development and dissemination of innovative energy efficiency technologies and practices. The ITP invests in high-risk, high-value cost-shared R&D projects to reduce industrial energy use and process waste streams, while stimulating productivity and growth. Competitive solicitations are the principal mechanism used by ITP to conduct cost-shared R&D. Solicitations

reflect the priorities of the Program and selection of projects follows merit-based criteria that emphasize projected energy, environmental, and economic benefits. In addition, ITP makes available information and resources on other financial assistance and research opportunities and case studies from past ITP projects. The ITP portfolio details over 1,000 technology development projects in which ITP has been involved.

While the U.S. industrial sector has become much more energy efficient over the past 30 years, there are still ample opportunities to achieve efficiency gains. However, energy-intensive industries face enormous competitive pressures that make it difficult to make the necessary R&D investments in technology development. Energy-intensive industries tend to exhibit relatively low levels of R&D spending, and are often unwilling to accept the risks associated with undertaking complex capital-intensive technology development and implementation. Constantly changing market conditions, energy prices, and other business concerns affect the ability and willingness of industry to pursue energy efficiency opportunities. As the role of energy in industry changes, the ITP should have the resources to sustain and expand operations, adapt, and reshape its strategy where needed. Without a sustained commitment by the private and public sectors to invest in technology R&D and adopt new technologies, the ability to close the gap between U.S. energy supply and demand will be greatly limited.

The budget for Industrial Technologies Program has decreased dramatically in recent years. The Fiscal Year 2007 budget request for Industrial Technologies was \$45.6 million, an \$11.3 million reduction from the Fiscal Year 2006 Appropriation. By comparison, appropriated levels as recently as Fiscal Year 2000 were as high as \$175 million. These funding levels reflect a dramatic shift in priorities away from industrial efficiency R&D. This legislation is needed to ensure continued gains in industrial energy efficiency and environmental performance through research and development.

The purpose of H.R. 3775 is to authorize and support research, development, demonstration, and commercial application of new industrial processes and technologies that will optimize energy efficiency and environmental performance of energy intensive industries; to enhance research and development through better coordination of inter-departmental research; and to expand Industrial Assessment Centers programs at universities to promote student training and adoption of energy efficient technologies and practices by small- and medium-sized industries.

Legislative History

On October 9, 2007, Representative Lampson introduced H.R. 3775. The bill was referred to the Committee on Science and Technology.

The Subcommittee on Energy and Environment met to consider H.R. 3775 on October 10, 2007. No amendments were offered. The Subcommittee ordered the measure to be reported to the Committee on a voice vote.

The Committee met to consider H.R. 3775 on October 16, 2007. Representatives Lampson and Inglis offered a manager's amend-

ment, which was adopted by a voice vote. The Committee ordered the measure reported, as amended, by a voice vote. On October 22, 2007, the Committee reported H.R. 3775 to the House (H.Rept. 110–401). On October 22, 2007, the House agreed to suspend the rules and pass the bill by voice vote.

On October 23, 2007, H.R. 3775 was received in the Senate and referred to the Senate Committee on Energy and Natural Resources. No further legislative action was taken on H.R. 3775.

2.30—H.R. 3776, ENERGY STORAGE TECHNOLOGY ADVANCEMENT ACT OF 2007

Background and Summary of Legislation

Stationary Storage Technologies: Today, electricity is generated as it is used, with very little being stored for later use. Though this system has worked for decades, it is not an efficient means of managing the electric power supply. Demand for electric power varies greatly throughout the day and throughout the year. Therefore, the electricity supply system must be sized to generate and transmit enough electricity to meet the maximum anticipated demand, or peak demand. The inefficiency of this system becomes evident when considering that peak electricity demand for any given year could be for a very short period of time—a few days or even hours—leaving considerable excess generation capacity. Rather than maintain massive generation systems that are designed around a short-lived peak demand, energy storage technologies would provide a means to stockpile energy for later use, and consequently reduce the need to generate more power during times of peak electricity demand. Optimally, energy storage systems could be charged at night during off-peak consumption hours, and then discharge the energy during times of peak demand. Using existing generation capacity at night time to store energy for use during the day is more efficient, cheaper, helps to equalize the demand load, and ease the strain on the electricity grid.

The expanded use of energy storage would also help to avoid capital intensive upgrades of transmission and distribution facilities, as well as reduce the need to run certain generation plants that may have higher operating costs and/or have a poor emissions profile. Energy storage also can improve electricity reliability and energy security by providing an alternate source of power during an outage of the primary power source.

Advances in energy storage technologies are often regarded as key to increasing the reliability and widespread use of many renewable energy technologies. Renewables such as wind and solar produce electricity only when wind speeds are high enough and sunlight is bright enough to generate power. Strategically distributed storage would permit electricity from these renewable sources to be stored and used during times of high demand or low resource availability.

Smaller energy storage systems may also be deployed in distributed stationary applications, such as residences or neighborhoods, in order to supply back-up energy and level the load on the electric grid. Advances in smaller energy storage systems, specifically bat-

teries, may also allow for entirely new vehicles such as plug-in hybrid vehicle technologies to enter the mass market.

Energy Storage Technologies for Vehicles: Concerns about energy independence and climate change have caused a renewed interest in enhancing the role of electricity in the transportation sector. The benefits of this have been seen to some degree in the rise in popularity of Hybrid Electric Vehicles (HEV) because of their high fuel efficiency and lower emissions. Switching vehicles' primary energy source from petroleum-based fuels to electric batteries reduces overall consumption of conventional liquid fuels. Additionally, several recent studies have shown that, regardless of its source, electricity used as a vehicle fuel reduces greenhouse gas emissions. However, greater electrification of the vehicles sector is constrained by the technological limits of energy storage technologies used in conventional hybrids, specifically the Nickel Metal Hydride (NiMH) batteries.

Plug-In Hybrid Electric Vehicles (PHEV's) are seen by some as the next logical step towards greater electrification of the transportation sector, and the eventual move towards market acceptance of all-electric drive vehicles. PHEV's allow for electricity to be used as an additional or even primary source of power for a vehicle, with a secondary role for the gasoline engine as a back-up power system. Advocates claim that 100 miles per gallon would be reasonable for PHEV's, approximately twice the gasoline mileage of today's hybrids. However, current NiMH batteries for conventional hybrids are not optimal for this application.

While significant technological advances are still likely in NiMH, and even the ubiquitous Lead Acid batteries, many in the industry believe the future of PHEV's depends on breakthroughs in new battery technologies, such as the lithium ion (Li-Ion) batteries. To expand the use of electricity in the vehicles sector batteries must be smaller, lighter, more powerful, higher energy and cheaper—all of which require considerable research and development. Achieving these needed breakthroughs will require meaningful federal support and public-private partnerships with a range of stakeholders.

Enhanced federal research and development of advanced energy storage technologies offers a number of economic, environmental and security benefits including greater efficiency and reliability in the electricity delivery system, better integration of renewable energy supplies into the electric grid, and less reliance on conventional transportation fuels. However, significant challenges remain in developing these technologies and establishing a viable domestic supply chain. H.R. 3776 authorizes the Department of Energy to conduct research and development programs on energy storage technologies, and expands this research to the demonstration of promising storage technologies and the manufacturing methods to allow for their production in the U.S.

Legislative History

On October 9, 2007, Representative Gordon, Chairman of the Committee on Science and Technology, introduced H.R. 3776. The bill was referred to the Committee on Science and Technology.

On October 10, 2007, the Subcommittee on Energy and Environment met to consider H.R. 3776. No amendments were offered. The

Subcommittee ordered the measure to be forwarded to the Committee by a voice vote.

On October 16, 2007, the Committee met to consider H.R. 3776. Representative Gordon offered a manager's amendment which was adopted by voice vote. Representatives Biggert and Inglis offered an amendment which was also adopted by voice vote. The Committee ordered the measure reported, as amended, by voice vote. The bill was reported to the House on October 22, 2007 (H.Rept. 110-402). On October 22, 2007, the House agreed to a motion to suspend the rules and pass H.R. 3776 by a voice vote.

On October 23, 2007, H.R. 3776 was received in the Senate and referred to the Energy and Natural Resources Committee. No further legislative action was taken on H.R. 3776.

This bill text of H.R. 3776 was generally incorporated in H.R. 6, *Energy Independence and Security Act of 2007*. H.R. 6 was signed into law as P.L. 110-240 on December 19, 2007.

2.31—H.R. 3877, MINE COMMUNICATIONS TECHNOLOGY INNOVATION ACT

Background and Summary of Legislation

In 2006, the number of miner fatalities in United States mines amounted to 72, the highest number since 2001 and a sharp rise after years of progress in lowering these numbers. From January through October of 2007, there have been 26 miner fatalities. The high number of fatalities has spurred a number of Congressional investigations as well as the passage of legislation targeted towards improving mine safety.

Mine collapses have emphasized the need for effective tracking of miners underground as well as the need for emergency communications between miners inside the mine and personnel outside the mine. Mines generally have reliable and effective communications systems that often include hard-wired networks, but these systems are often compromised during catastrophic events. Experience has shown that such technologies must function in post-disaster environments and enable two-way communication.

Further research regarding underground communications and the applicability of existing technology to the underground mine environment is necessary in order to foster the development of next generation mine tracking and communications technology. Currently, communications for underground mines is unregulated and many necessary metrics and standards have not been developed in this niche field. Government-sponsored research and the development of consensus standards in this field would aid in the acceleration of next-generation technology to better protect underground miners. As a technical agency with significant experience in developing consensus industry standards and providing measurement services to other industries, the National Institute for Standards and Technology (NIST) is well poised to assist in these tasks for the field of mine communications. NIST has a long history of working in close collaboration with industry to facilitate research and development in longer-term, high-risk research which will yield national benefits.

The purpose of H.R.3877 is to authorize a research, development, and demonstration program at NIST to accelerate the development of innovative mine communications and tracking technology; and to require the director of NIST to work with industry and relevant federal agencies to determine research priorities, which may include emergency communications systems, systems for deep underground mines, hybrid wireless and infrastructure based systems, or other optional priorities. This project will include the establishment of best practices and adaptation of existing technology. The bill authorizes to NIST such sums as are necessary to carry out these programs for fiscal years 2009 and 2010, to be derived from amounts authorized to NIST in the *America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act* (Public Law 110–69).

Legislative History

On October 17, 2007, Representative Matheson introduced H.R. 3877. The bill was referred to the Committee on Science and Technology.

On October 24, 2007, the Committee met to consider H.R. 3877. Representative Matheson offered an amendment, which was adopted by a voice vote. The Committee ordered the measure reported, as amended, by a voice vote. On October 29, 2007 the Committee favorably reported H.R. 3877 to the House (H.Rept. 110–411). On October 29, 2007, the House agreed to suspend the rules and pass H.R. 3877 by voice vote.

On October 30, 2007, H.R. 3877 was received in the Senate and referred to the Committee on Health, Education, Labor, and Pensions. No further legislative action was taken on H.R. 3877.

2.32—H.R. 3916, BORDER SECURITY TECHNOLOGY INNOVATION ACT OF 2008

Background and Summary of Legislation

The United States has nearly 7,500 miles of land border with Canada and Mexico, over which half a billion people and 2.5 million rail cars pass per year. In addition, over 300 U.S. ports receive around nine million cargo containers each year. The United States Customs and Border Protection (CBP) processes approximately 1.18 million people entering the U.S. through established ports of entry every day. CBP is also responsible for monitoring areas between legal entry points along the Northern and Southern borders and for intercepting individuals attempting to smuggle contraband or cross the border illegally. In fiscal year 2005 (FY 2005), U.S. Border Patrol agents apprehended 1.19 million people attempting to enter the country illegally. In addition, over 26,000 kilograms of marijuana was seized in Northern Border States in 2005 and over 30,000 kilograms of cocaine, heroin, and methamphetamine were seized within 150 miles of the U.S.-Mexico border in 2006. However, the Government Accountability Office estimates that one in ten serious drug and weapon violators and undocumented immigrants pass through airports and land borders undetected.

The Department of Homeland Security (DHS) invests nearly \$1.5 billion annually in research and development (R&D) projects at its

Science and Technology (DHS S&T) Directorate and Domestic Nuclear Detection Office of which approximately \$25 million is directed to border security-specific projects. However, many promising technologies are still not feasible for full implementation along the border because of numerous obstacles including high cost, lack of robustness in harsh conditions, lack of personnel trained to properly use high-tech equipment, and technical problems. DHS S&T has primary responsibility for bringing new technologies to full readiness, with support from other agencies such as the National Institute of Standards and Technology (NIST). In addition, many capability gaps identified by end-users, including situational awareness and officer safety, require further basic and applied research to meet existing or anticipated challenges.

Border security research accounts for only 3.7 percent of DHS S&T's research budget in FY 2008 and 4.0 percent in the President's FY 2009 request. Further investment has the potential to significantly improve border security through effective, efficient, and evolving defenses against a wide range of threats including undocumented border crossings, human trafficking, drug smuggling and terrorism.

H.R. 3916 strengthens control of our nation's borders through R&D of effective, efficient, and evolving defenses. The bill focuses on key long-term technologies that could substantially improve the security of our nation's borders such as: Unmanned Aerial Vehicles, tunnel detection, anti-counterfeit technologies, Global Positioning System technologies, and mobile biometric technologies. In addition, the bill instructs the Science and Technology Directorate to improve processes for setting research priorities and serving the needs of technology end-users.

Legislative History

On October 22, 2007, Representative Hall, Ranking Member of the Committee on Science and Technology, introduced H.R. 3916. The bill was referred to the Committee on Homeland Security, as well as the Committee on Science and Technology.

On February 7, 2008, the Subcommittee on Technology and Innovation met to consider H.R. 3916. Representative Mitchell offered an amendment, which was adopted by voice vote. The measure was ordered reported to the Committee, as amended, by a voice vote.

On February 27, 2008, the Committee met to consider H.R. 3916. Representative McNerney, Representative McCaul, and Representative Hall offered amendments to the bill, which were all adopted by separate voice votes. The measure was ordered reported, as amended, by a voice vote. On June 4, 2008, the Committee reported H.R. 3916 to the House (H.Rept. 110-684). No further legislative action was taken on H.R. 3916.

2.33—H.R. 3957, WATER USE EFFICIENCY AND CONSERVATION RESEARCH ACT OF 2007

Background and Summary of Legislation

Drought and recent water shortages in several regions of the United States have increased concern about water supply at all levels of government. Since 1950, the United States population has in-

creased nearly 90 percent. In that same period, public demand for water has increased 209 percent. Thirty-six states are anticipating local, regional, or statewide water shortages by 2013. Some states are already in the middle of a severe drought.

Although some water efficiency strategies require an initial capital investment, in the long run, conserving water provides significant cost savings for water and wastewater systems. Water efficiency and re-use programs help systems avoid, down-size, and postpone expensive infrastructure projects, by developing new water supplies.

In conjunction with its statutory responsibilities to ensure water quality under the *Clean Water Act* and the *Safe Drinking Water Act*, EPA has a program of research and development on water treatment technologies, health effects of water pollutants, security from deliberate contamination, and watershed protection. Current annual funding for these activities is approximately \$50 million. EPA currently has no research and development effort that addresses water supply, water-use efficiency or conservation.

H.R. 3957 establishes a research and development program within the Environmental Protection Agency's Office of Research and Development (ORD) to promote water use efficiency and conservation. The research program includes the development of technologies and processes to expand water supplies through storage, treatment, and reuse of rainwater, stormwater, and greywater; research on water storage and distribution systems; research on behavioral, social, and economic barriers to achieving greater water efficiency; and research on the use of watershed planning.

Legislative History

On October 24, 2007, Representative Matheson introduced H.R. 3957. The bill was referred to the Committee on Science and Technology.

The Subcommittee on Energy and Environment met to consider H.R. 3957 on May 6, 2008. No amendments were offered. The Subcommittee voted to report the measure to the Committee by voice vote.

The Committee met to consider H.R. 3957 on July 16, 2008. Representative Matheson offered a manager's amendment to make technical corrections to the bill and the amendment was adopted by voice vote. Representative Johnson offered an amendment which was adopted by voice vote. Representative Gingrey offered an amendment which was also adopted by voice vote. Finally, an amendment offered by Representative Giffords was adopted by voice vote. The Committee voted to report the measure, as amended, to the House by voice vote. On July 30, 2008, the Committee reported H.R. 3957 to the House (H.Rept. 110-802). On July 30, 2008, the House suspended the rules and passed H.R. 3957 by voice vote.

On July 31, the bill was referred to the Senate Committee on Environment and Public Works. No further legislative action was taken on H.R. 3957.

2.34—H.R. 4174, FEDERAL OCEAN ACIDIFICATION RESEARCH AND MONITORING ACT

Background and Summary of Legislation

Ocean hydrogen ion concentration (a measure of acidity) has increased 30 percent since pre-industrial times. Studies have also projected that by the end of the century carbon dioxide emission scenarios could result in the lowest levels of ocean pH in 20 million years. The potential impacts of ocean acidification are diverse and far-reaching, and may include adverse impacts on marine ecosystems, food webs for many fish and marine mammals, and the economies of many coastal states that rely upon the seafood industry and coastal and ocean tourism. Increasing acidity and changes in ocean chemistry have been shown to be corrosive to shell-forming plankton, a major food source for baleen whales and commercially important fish species such as salmon, mackerel, herring, cod, and others. Some studies have also suggested that ocean acidification could be detrimental to shellfish including scallops, clams, and lobsters. Evidence indicates that calcification rates will decrease and carbonate dissolution rates will increase for these calcifying organisms leaving them unable to compete ecologically, perhaps even threatening them to the point of extinction.

Shallow water corals will probably face similar threats due to decreased growth rates and increased shell corrosion. Corals comprise some of the richest habitats on Earth. According to NOAA, about 4,000 species of fish, including approximately half of all federally-managed fisheries, depend on coral reefs and related habitat for a portion of their life cycles, and they estimate that the value of U.S. fisheries from coral reefs exceeds \$100 million. Juvenile fish may face physiological challenges including respiratory stress and acidosis associated with increased ocean acidification. Deep sea corals and other animals are also threatened by changes in ocean chemistry and may find parts of the deep ocean uninhabitable by the end of this century. The Administration's Joint Subcommittee on Ocean Science and Technology of the National Science and Technology Council highlighted ocean acidification as a research priority in their 2007 report, *Charting the Course for Ocean Science in the United States for the Next Decade: An Ocean Research Priorities Plan and Implementation Strategy*. The report explains that ocean acidification and other physical and biogeochemical changes may irreversibly alter ecosystems. Sustained ocean observations, process and applied research, and modeling are recommended in the report as necessary tools and research to help determine changes over time and to help identify and quantify ecosystem impacts.

Ocean acidification is an emerging issue and scientific experts have testified to the need for increased research and monitoring. There is significant uncertainty as to the rate and magnitude of change that will occur in the ocean and as to what the full impacts to marine organisms and ecosystems will be.

H.R. 4174, the *Federal Ocean Acidification Research and Monitoring Act of 2008*, establishes an interagency program to develop and coordinate a comprehensive plan to better understand and address the impacts of ocean acidification, to provide for assessment

of ecosystem and socioeconomic impacts of ocean acidification and to provide for research on adaptation strategies to conserve marine ecosystems. National investment in a coordinated program of research and monitoring will improve understanding of ecosystem responses and provide marine resource managers the information they need to develop strategies for the protection of critical species, habitats, and ecosystems. The bill designates JSOST as the coordinating body for interagency activities on ocean acidification and requires JSOST to involve the extramural ocean community in the development of the plan, including universities, states, industry and environmental groups. The bill also authorizes ocean acidification activities at the National Science Foundation and the National Aeronautics and Space Administration.

Legislative History

On November 14, 2007, Representative Allen introduced H.R. 4174. The bill was referred to the Committee on Science and Technology.

The Subcommittee on Energy and Environment met to consider H.R. 4174 on June 18, 2008. Representatives Baird and Inglis offered an amendment in the nature of a substitute, which was adopted by voice vote. The Subcommittee reported the bill, as amended, to the Committee by voice vote.

On June 25, 2008, the Committee met to consider H.R. 4174. A manager's amendment offered by Representatives Baird and Inglis was adopted by voice vote. The Committee ordered the measure, as amended, reported by a voice vote. On July 9, 2008, the Committee on Science and Technology reported H.R. 4174 to the House (H.Rept. 110-749). The House suspended the rules and passed the bill by voice vote on July 9, 2008.

On July 10, 2008, H.R. 4174 was received in the Senate and placed on the Senate Legislative Calendar under General Orders. No further legislative action was taken on H.R. 4174.

2.35—H.R. 5161, GREEN TRANSPORTATION INFRASTRUCTURE RESEARCH AND TECHNOLOGY TRANSFER ACT

Background and Summary of Legislation

Infrastructure, such as roads and parking lots, comprised of surfaces that are impervious to water, can have significant impacts on an area's natural hydrology, potentially resulting in flooding, pollution, or aquatic ecosystem destruction. Stormwater runoff washes over agricultural land, lawns, urban areas, and other types of human land-use areas, introducing chemicals like fertilizers, heavy metals, and harmful bacteria into water ecosystems such as streams, lakes, and rivers. Transportation infrastructure is a major contributor to this type of pollution. This type of non-localized pollution is responsible for over 80 percent of the contamination of the Nation's surface water. Thus, development of new transportation infrastructure has a significant and far-ranging environmental impact.

To be effective in countering the negative impact of rainfall runoff, mitigation measures must meet the goals of reducing the speed and volume of flow and treating or reducing pollutants. Green

transportation infrastructure uses innovative materials, structural measures, and design techniques to address these goals. However, many local governments are constrained by environmental regulations that stipulate specific methods for reducing water pollution, and are unable to include innovative green infrastructure technologies and techniques in their storm-water management plans. There are numerous other barriers to full adoption of green infrastructure, including technical problems, regulatory challenges, and slow industry adoption of new practices. The installation of green transportation infrastructure can be impeded by problems of high cost and availability of space for technologies. Climate conditions can also present unique challenges to implementation. Furthermore, governments or private companies who propose the use of green transportation infrastructure are not given approval simply because the innovative technologies have not been previously considered by the regulating authority. The problem then becomes self-perpetuating, as these local governments block all potential demonstration projects, and continue to deny builders permits on the basis that there have been no successful demonstration projects. The slow adoption of these technologies has also led to a shortage of trained contractors who are able to properly design and install integrated systems, making implementation more difficult and costly.

H.R. 5161 authorizes the U.S. Department of Transportation to provide grants to national and regional university transportation centers to carry out research on and technology transfer in the field of green transportation infrastructure. Grant recipients are selected via a merit-based competition, with preference given to those institutions demonstrating expertise in the environmental effects of transportation infrastructure; research capacity and technology transfer resources; partnerships with government and industry; and other attributes. Authorized activities include research and development of innovative infrastructure technologies; establishment of regional technology transfer programs; studies of the impact of government regulations on implementation of green infrastructure programs; and public education campaigns aimed at public and private stakeholders. The bill requires the Secretary of Transportation to convene an annual meeting of centers to foster collaboration and dissemination of findings. H.R. 5161 authorizes \$6 M per fiscal year for fiscal years 2009 and 2010 for grants to the university transportation centers. To promote technology transfer, the bill requires the Federal Highway Administration to incorporate education and training on green transportation infrastructure into its National Highway Institute curriculum. Finally, the bill defines green transportation infrastructure as infrastructure that preserves and restores natural processes and landforms, uses natural design techniques to manage storm water; and minimizes life cycle energy consumption and air pollution.

Legislative History

On January 29, 2008, Representative Wu introduced H.R. 5161. The bill was referred to the Committee on Transportation and Infrastructure, and to the Committee on Science and Technology.

On February 7, 2008, the Subcommittee on Technology and Innovation met to consider H.R. 5161. Representative Ehlers offered an amendment to the bill, which was adopted by a voice vote. The measure, as amended, was reported to the Committee by a voice vote.

On February 27, 2008, the Committee met to consider H.R. 5161. Representative Wu and Representative Inglis both proposed amendments which were adopted by separate voice votes. Representative Inglis proposed an additional amendment which was withdrawn. The Committee ordered the measure reported, as amended, by a voice vote. On April 10, 2008, the Committee favorably reported the bill to the House (H.Rept. 110-576, Part 1). No further legislative action was taken on H.R. 5161.

2.36—H.R. 5789, SCIENCE AND TECHNOLOGY INNOVATION ACT; H.R. 5819, SBIR/STTR REAUTHORIZATION ACT

Background and Summary of Legislation

The Small Business Innovation Research (SBIR) program was established in 1982 by the *Small Business Innovation Development Act* (P.L. 97-219) to increase the participation of small, innovative firms in federal research and development (R&D) activities and to develop commercializable technologies. The Act outlined four broad congressional goals: to stimulate technological innovation; to use small business to meet federal R&D needs; to foster and encourage participation by socially and economically disadvantaged persons in technological innovation; and to increase the private sector commercialization of innovations derived from federal R&D investment. SBIR has been reauthorized three times, in 1986, 1992 and 2000, with authorization extended through September 30, 2008. The Small Business Technology Transfer (STTR) program was established in 1992 by the *Small Business Technology Transfer Act of 1992* (P.L. 102-564, Title II), and reauthorized in 1997 and in 2001, through September 2009.

Since its inception in 1982 until 2005, over \$18.9 billion in SBIR awards have been made for more than 88,800 research projects. The award levels for Phase I and II awards have not been adjusted for inflation since 1992 for SBIR and since 2001 for STTR. Currently, eleven departments and agencies sponsor SBIR programs.

H.R. 5789 and H.R. 5819 reauthorize SBIR and STTR through 2010. In addition, the bills make improvements to the programs by enhancing the size and allowing for increased flexibility of awards, allowing greater participation by businesses that have secured non-governmental funding, and giving agencies the administrative funding needed for encouraging commercialization.

Legislative History

On April 15, 2008, Representative Wu introduced H.R. 5789. It was referred to the Committee on Small Business, and to the Committee on Science and Technology.

On April 15, 2008, the Subcommittee on Technology and Innovation met to consider H.R. 5789. Representative Ehlers offered an amendment and Representative Gingrey offered two amendments, none of which were adopted. Representative Wilson and Represent-

ative Smith of Nebraska both offered amendments, which were both adopted by separate voice votes. The Subcommittee ordered the measure, as amended, reported to the Committee by a voice vote. No further legislative action was taken on H.R. 5789.

On April 16, 2008, Representative Velasquez introduced H.R. 5819, which incorporated provisions from H.R. 5789. H.R. 5819 was referred to the Committee on Small Business, and the Committee on Science and Technology.

On April 18, 2008, the Committee discharged H.R. 5819. On April 23, 2008, the House voted to pass H.R. 5819 on a recorded vote of 368–43.

On April 24, 2008, H.R. 5819 was received in the Senate and referred to the Committee on Small Business and Entrepreneurship. No further legislative action was taken on H.R. 5819.

2.37—H.R. 5940, NATIONAL NANOTECHNOLOGY INITIATIVE AMENDMENTS ACT OF 2008

Background and Summary of Legislation

The Science and Technology Committee was instrumental in the development and enactment of the *21st Century Nanotechnology Research and Development Act of 2003* (P.L. 108–153), which authorizes the interagency National Nanotechnology Initiative (NNI). The 2003 statute put in place formal interagency planning, budgeting, and coordinating mechanisms for NNI. The National Science and Technology Council, through the Nanoscale Science, Engineering, and Technology (NSET) Subcommittee, plans and coordinates the NNI, and the National Nanotechnology Coordination Office (NNCO) provides technical and administrative support to the NSET.

There are twenty-six federal agencies that participate in the NNI, with 13 of those agencies reporting a nanotechnology research and development budget. The total estimated NNI budget for fiscal year 2008 is \$1.49 billion. P.L. 108–153 also provides for formal reviews of the content and management of the program by the National Academy of Sciences and by the NNI Advisory Panel, a statutorily created advisory committee of non-government experts. These reviews have found that the coordination and planning processes among the participating agencies in the NNI are largely effective.

The NNI supports productive, cooperative research efforts across a spectrum of disciplines, and it is establishing a network of national facilities for support of nanoscale research and development. However, the formal reviews by external experts noted above, as well as the findings of the Committee's oversight hearings on the NNI, have identified aspects of the interagency program that could be strengthened and improved. These areas are environmental, health and safety research; technology transfer and the fostering of commercialization of research results; and educational activities.

The purpose of H.R. 5940 is to improve the content and various aspects of the planning and coordination of the National Nanotechnology Initiative (NNI). This includes provisions to strengthen the planning and implementation of the environment, health, and safety research component of the NNI; to increase em-

phasis on nanomanufacturing research, technology transfer, and commercialization of research results flowing from the program; to create a new NNI component of focused, large-scale research and development projects in areas of national importance; and to enhance support for K–16 nanotechnology-related education programs.

Legislative History

On May 1, 2008, Representative Gordon, Chairman of the Committee on Science and Technology introduced H.R. 5940. The bill was referred to the Committee on Science and Technology.

The Committee met to consider H.R. 5940 on May 7, 2008. An amendment offered by Representative Johnson and an amendment offered by Representative Baird were adopted by separate voice votes. The Committee voted by voice vote to report the bill, as amended, to the House. On June 4, 2008, the Committee reported H.R. 5940 to the House (H.Rept. 110–682). On June 5, 2008, the House agreed to a motion to suspend the rules and pass H.R. 5940 by a recorded vote of 407–6.

On June 6, 2007, H.R. 5940 was received in the Senate and referred to the Committee on Commerce, Science, and Transportation. No further legislative action occurred on H.R. 5940.

2.38—H.R. 6323, HEAVY DUTY HYBRID VEHICLE RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACT OF 2008

Background and Summary of Legislation

The purpose of H.R. 6323 is to establish a research, development, demonstration, and commercial application program to promote research of appropriate technologies for heavy duty hybrid vehicles, and for other purposes.

Large, heavy duty trucks that rely on a diesel or gasoline internal combustion engine for power typically have relatively low fuel economy and high emissions. This is especially evident in trucks with duty-cycles that include frequent starts and stops, long periods of engine idling, or addition power for auxiliary systems such as bucket lifters, trash compactors, off-board power tools, air conditioning, refrigeration, or other work-related equipment. Switching a portion of the driving and auxiliary power loads away from the internal combustion engine to an alternate power source would enable these vehicles to realize considerable fuel savings and emissions reductions compared to conventional models. The Environmental Protection Agency (EPA) estimates that an average delivery truck using a hybrid drive system could save approximately 1,000 gallons of diesel per year compared to one with a conventional drive system.

Despite substantial investment in both the defense and commercial sectors, the cost of research and development and the final price of heavy duty hybrid vehicles remain prohibitively high, even for military applications. Consequently, there remain significant technical obstacles to development and final commercial application of these technologies that federally-sponsored R&D activities can help to overcome. Managing a comprehensive federal R&D program is complicated by the fact that there is no one-size-fits-all hybrid

solution for the entire heavy duty vehicle sector. The power demands of heavy duty trucks are as varied as the applications. For example, through the course of an average drive cycle the charging and discharging of a hybrid system on a refuse truck with its frequent starts and stops, dumpster lifting, and trash compaction will be considerably different than that of a utility truck, which may idle in one place for several hours to operate a boom or other equipment. Class 8 long haul tractor trailers present an even greater challenge they seldom brake enough to charge batteries through regenerative braking. The energy storage devices and related control systems may be altogether different for each of these platforms. Future generations of heavy trucks may also include plug-in hybrid electric models that can store more electric energy in larger banks of batteries and charge these batteries through direct connection to the electricity grid either while in operation on a job site or in a parking lot or garage.

The majority of federal funding for hybrid vehicle R&D has focused on passenger vehicles which far outnumber heavy trucks. However, the federal R&D portfolio should address the significant potential for fuel savings and emissions reductions through improvements in the heavy duty vehicle sector, and take advantage of the ability of this sector to deploy new technologies more quickly. The Department of Energy (DOE) has funded limited research on the hybridization of trucks, most recently through the 21st Century Truck Partnership which conducts research and development through joint public and private efforts. Other federal agencies involved in the 21st Century Truck Partnership include the Department of Defense, the Department of Transportation, and EPA. DOE does not currently offer any competitive grants that target the development of technologies applicable for use in hybrid trucks.

H.R. 6323 directs the Secretary of DOE (Secretary) to establish a grant program for the development of advanced heavy duty hybrid vehicles. The bill gives the Secretary the discretion to award between three and seven grants based on the technical merits of the proposals received. At least half of the awarded grants must be for the development of plug-in hybrid trucks. H.R. 6323 also directs the Secretary to conduct a study of alternative power train designs for use in advanced heavy duty hybrid vehicles. Grant applicants may include partnerships between manufacturers or electrical utilities in to conduct research authorized by the bill. Awards under H.R. 6323 will be for up to \$3 million per year for three years. Appropriations are authorized for \$16 million per year for fiscal years 2009 through 2011.

Legislative History

On June 17, 2008, the Subcommittee on Energy and Environment met to consider a Chairman's Mark of the "*Heavy Hybrid Truck Research and Development Act of 2008*," a bill authored by Representative Sensenbrenner. An amendment offered by Ms. Biggert was agreed to by voice vote. The Subcommittee reported the Chairman's Mark, as amended, to the Committee on a voice vote.

The Chairman's Mark, as reported by the Subcommittee on Energy and Environment, was introduced on June 19, 2008 as H.R.

6323, the “*Heavy Hybrid Truck Research and Development Act of 2008*” by Representative Sensenbrenner. The bill was referred to the Committee on Science and Technology.

On July 16, 2008, the Committee met to consider H.R. 6323. An amendment in the nature of a substitute offered by Representative Hall on behalf of Mr. Sensenbrenner was agreed to by voice vote. An amendment to the amendment in the nature of a substitute offered by Mr. Reichert was agreed to by voice vote. The Committee voted by voice vote to report the bill, as amended, to the House. On September 16, 2008, the Committee reported H.R. 6323 to the House (H.Rept. 110–855). On September 24, 2008, the House agreed to suspend the rules and pass H.R. 6323 by voice vote.

On October 2, 2008, H.R. 6323 was received in the Senate and referred to the Committee on Commerce, Science and Transportation. No further legislative action was taken on H.R. 6323.

Chapter III—Commemorative Resolutions Discharged by the Committee on Science and Technology and Passed by the House of Representatives

3.1—H.CON.RES. 34, HONORING THE LIFE OF PERCY LAVON JULIAN, A PIONEER IN THE FIELD OF ORGANIC CHEMISTRY RESEARCH AND DEVELOPMENT AND THE FIRST AND ONLY AFRICAN AMERICAN CHEMIST TO BE INDUCTED INTO THE NATIONAL ACADEMY OF SCIENCES

Background and Summary of the Legislation

H.Con.Res. 34 honors the life of Percy Lavon Julian, a pioneer in the field of organic chemistry research and development and the first and only African American chemist to be inducted into the National Academy of Sciences and lists his many achievements including becoming the first to discover a process to synthesize physostigmine, the drug used in the treatment of glaucoma; pioneering a commercial process to synthesize cortisone from soy beans and yams, enabling the widespread use of cortisone as an affordable treatment of arthritis; and being awarded over 130 patents.

Legislative History

H.Con.Res. 34, was introduced by Representative Eddie Bernice Johnson and solely referred to the Committee on Science and Technology on January 18, 2007. The resolution was marked up and ordered reported on January 24, 2007. It was reported by the Committee on Science and Technology (H.Rept. 110–4) on January 29, 2007 and placed on the House Calendar. On January 30, 2007, the House debated the resolution under suspension of the rules and passed the resolution, 418–0, on January 31, 2007. It was received in the Senate on January 31, 2007 and on February 1, 2007 the resolution was agreed to in Senate without amendment by Unanimous Consent.

3.2—H.CON.RES. 76, HONORING THE 50TH ANNIVERSARY OF THE INTERNATIONAL GEOPHYSICAL YEAR (IGY) AND ITS PAST CONTRIBUTIONS TO SPACE RESEARCH, AND LOOKING FORWARD TO FUTURE ACCOMPLISHMENTS

Background and Summary of the Legislation

H.Con.Res. 76 honors the 50th anniversary of the International Geophysical Year (IGY) and its contributions to the scientific investigations of the Earth and outer space; and encourages the public, and especially American youth, to attend IGY celebrations and seminars, such as those being planned at locations around the United States by the National Academy of Sciences and other orga-

nizations, and to participate in discussions about the future of space science and Earth science.

Legislative History

H.Con.Res. 76 was introduced by Congressman Mark Udall on March 1, 2007 and was referred to the House Committee on Science and Technology. On March 28, 2007 the Committee ordered the resolution reported by voice vote. On April 16, 2007, the House of Representatives considered the resolution under suspension of the rules. On April 17, 2007 the House passed the resolution 406–0. On April 18, 2007, the resolution was received in the Senate and referred to the Committee on the Judiciary which reported the bill without amendment on May 24, 2007. On June 20, 2007, the Resolution was agreed to in the Senate without amendment.

3.3—H.CON.RES. 95, HONORING THE CAREER AND RESEARCH ACCOMPLISHMENTS OF FRANCES E. ALLEN, THE 2006 RECIPIENT OF THE A.M. TURING AWARD

Background and Summary of the Legislation

H.Con.Res. 95 honors the pioneering life work of Frances Allen in computer research and development and salutes the Turing Award Committee for recognizing, through the selection of Frances Allen, that creative women have contributed mightily to the development of this important field. It also gives highlights of Frances Allen's 45 year career at IBM including her being the first woman to be named an IBM Fellow; her becoming President of the IBM Academy of Technology; her fundamental contributions to the theory and practice of program optimization, compiler design and machine architecture; and her work in encouraging women to study computer science.

Legislative History

H.Con.Res. 95 was introduced by Congresswoman Woolsey on March 20, 2007 and referred to the House Committee on Science and Technology. On April 24, 2007 the Committee considered H.Con.Res. 95 and ordered it reported by a unanimous voice vote. On May 1, 2007, the House of Representatives considered the resolution under suspension of the Rules and ordered it reported by voice vote. On May 2, 2007, the resolution was received in the Senate and referred to the Committee on the Judiciary.

3.4—H.CON.RES. 147, RECOGNIZING 200 YEARS OF RESEARCH, SERVICE TO THE PEOPLE OF THE UNITED STATES, AND STEWARDSHIP OF THE MARINE ENVIRONMENT BY THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION AND ITS PREDECESSOR AGENCIES, AND FOR OTHER PURPOSES

Background and Summary of the Legislation

H.Con.Res. 147 recognizes 200 years of research, service to the people of the United States, and stewardship of the marine environment by the National Oceanic and Atmospheric Administration and its predecessor agencies beginning with the Act of February

10, 1807 (chapter VIII; 2 Stat. 413), signed by President Thomas Jefferson, which authorized and requested the President ‘to cause a survey to be taken of the coast of the United States . . . together with such other matters as he may deem proper for completing an accurate chart of every part of the coasts.’ The resolution details the agency’s accomplishments and recognizes the contributions made over the last 200 years by the past and current employees and officers of the Coast Survey, the National Geodetic Survey, and the Center for Operational Oceanographic Products and Services of the National Oceanic and Atmospheric Administration. It also encourages the people of the United States to salute and share in the planned celebrations of these historic programs during 2007 with ceremonies designed to give appropriate recognition to one of our oldest and most respected federal agencies on the occasion of its bi-centennial anniversary.

Legislative History

H.Con.Res. 147 was introduced by Congressman Henry Brown on 5/10/2007 and referred to the Committee on Natural Resources, and its Subcommittee on Fisheries, Wildlife, and Oceans. and in addition to the Committee on Science and Technology, for a period to be subsequently determined by the Speaker. The Subcommittee on Fisheries, Wildlife, and Oceans held a legislative hearing on June 5, 2007. The bill was discharged from both Committees and on December 4, 2007, the House suspended the Rules and agreed to the resolution by a vote of 414–0. On December 6, 2007, H.Con.Res. 147 was received in the Senate and referred to the Committee on Commerce, Science, and Transportation.

3.5—H.CON.RES. 222, COMMENDING NASA LANGLEY RESEARCH CENTER IN VIRGINIA ON THE CELEBRATION OF ITS 90TH ANNIVERSARY ON OCTOBER 26 AND 27, 2007

Background and Summary of the Legislation

H.Con.Res. 222 commends the men and women of NASA Langley Research Center for their accomplishments and role in inspiring the American people and commends NASA Langley Research Center in Virginia on the celebration of its 90th anniversary on October 26 and 27, 2007 Langley began in 1917, as the Nation’s first civilian aeronautical research laboratory was established by the National Advisory Committee for Aeronautics in Virginia, and named Langley Memorial Aeronautical Laboratory. Now called the National Aeronautics and Space Association (NASA) Langley Research Center, is one of the Nation’s most prolific and most honored aerospace laboratories with a rich history of pioneering aviation breakthroughs, exploring the universe, and conducting ground breaking climate research, having helped give birth to the space age by conceiving and managing Project Mercury, the first United States manned space program, training the original seven astronauts, proving the feasibility of the lunar orbiter rendezvous, developing the lunar excursion module concept and research facilities for simulating landing on the Moon, and successfully sending the first Viking landers and orbiters to Mars.

Legislative History

H.Con.Res. 222 was introduced on October 2, 2007 by Congresswoman JoAnn Davis and the rest of the Virginia Delegation and referred to the House Committee on Science and Technology. The bill was discharged from the Committee on Science and Technology on October 16, 2007 and considered under Suspension of the Rules. On October 17, 2007 it was agreed to by a vote of 421–0. On October 18, 2007 the resolution was received in the Senate, considered, and agreed to without amendment and with a preamble by Unanimous Consent.

3.6—H.CON.RES. 225, HONORING THE 50TH ANNIVERSARY OF THE DAWN OF THE SPACE AGE, AND THE ENSUING 50 YEARS OF PRODUCTIVE AND PEACEFUL SPACE ACTIVITIES

Background and Summary of the Legislation

This resolution honors the 50th anniversary of the dawn of the Space Act, on October 4, 1957 with the launch of Sputnik 1, an event that was followed soon after by the American launch of Explorer 1 as well as the ensuing 50 years of productive and peaceful space activities.

It recognizes the value of investing in America's manned and unmanned space program which evolved from cold war competition into an endeavor that has been marked by significant international cooperation, a significant increase in our understanding of the universe and its origin, large scale monitoring of the Earth's weather and climate, satellites transforming communications, navigation, and positioning, and a renewed commitment to research and to science, technology, engineering, and mathematics education akin to that which followed the dawn of the Space Age.

The resolution further declares it to be in America's interest to continue to advance knowledge and improve life on Earth through a sustained national commitment to space exploration in all its forms, led by a new generation of well educated scientists, engineers, and explorers.

Legislative History

Chairman Bart Gordon and eleven co-sponsors introduced H.Con.Res. 225 on October 3, 2007 and the resolution was referred to the Committee on Science and Technology. On October 16, 2007 the resolution was discharged from the Committee on Science and Technology and the resolution passed the House of Representatives under suspension of the rules. On October 17, 2007 the resolution was received in the Senate and on October 18, 2007 was referred to the Committee on Commerce, Science, and Transportation. On October 30, 2007, the Committee on Commerce, Science, and Transportation ordered the resolution to be reported without amendment favorably and on November, 2007 the resolution was reported without a written report and placed on Senate Legislative Calendar under General Orders.

3.7—H.CON.RES. 251, COMMENDING THE NATIONAL RENEWABLE ENERGY LABORATORY FOR ITS WORK OF PROMOTING ENERGY EFFICIENCY FOR 30 YEARS

Background and Summary of the Legislation

H.Con.Res. 251 commends the National Renewable Energy Laboratory for its work of promoting energy efficiency for 30 years and seeking other avenues of energy independence because these actions have enhanced our national security, sustained our environment and created jobs.

In 1977 the Solar Energy Research Institute opened and was designated a National Laboratory of the United States Department of Energy. In September 1991 President George H.W. Bush changed the institute's name to the National Renewable Energy Laboratory (NREL). NREL is now the principal research laboratory for the United States Department of Energy's Office of Energy Efficiency and Renewable Energy and it also provides research expertise for the Office of Science and the Office of Electricity Delivery and Energy Reliability. NREL's focused research and development capabilities are positioned to advance national energy goals by developing innovations to change the way we power our homes and businesses, and fuel our cars.

The resolution also recognizes the achievements of the scientists and employees of the NREL and their exemplary service to the United States for 30 years and directs the Clerk of the House to transmit a copy of this resolution to the NREL for appropriate display.

Legislative History

Congressman Perlmutter and three co-sponsors introduced H.Con.Res. 251 on November 8, 2007 and the bill was referred to the House Committee on Science and Technology. On December 5, 2007, the bill was discharged from the Committee on Science and Technology and passed the House of Representatives under suspension of the rules by voice vote. On December 12, 2007, the resolution was received in the Senate and referred to the Committee on Energy and Natural Resources.

3.8—H.CON.RES. 287, CELEBRATING THE 50TH ANNIVERSARY OF THE UNITED STATES EXPLORER I SATELLITE, THE WORLD'S FIRST SCIENTIFIC SPACECRAFT, AND THE BIRTH OF THE UNITED STATES SPACE EXPLORATION PROGRAM

Background and Summary of the Legislation

H.Con.Res. 287 celebrates the 50th anniversary of the United States Explorer I satellite, the world's first scientific spacecraft, and the birth of the United States space exploration program.

The launch of Explorer I marks the birth of the era of United States space exploration, and initiated a half-century of advances in both robotic and human exploration of space. Since the launch of Explorer I, the United States has launched spacecraft to explore each of the solar system's planets and the Earth's Moon; to observe the Earth and the interactions of its atmospheric, oceanic, and land

systems, to conduct studies of the Sun and its interactions with Earth; to investigate asteroids and comets; to understand the origin of the universe and the formation of the stars, galaxies, and planets; and to extend human presence into space.

Explorer I was launched as part of the International Geophysical Year, a major scientific initiative of 67 nations to collect coordinated measurements of the Earth. It carried a scientific instrument designed and built by the late Dr. James A. Van Allen of the University of Iowa to detect cosmic rays.

These cosmic ray measurements from Explorer I led to the discovery of regions of energetic charged particles trapped in the Earth's magnetic field, later named the Van Allen radiation belts. Therefore, the resolution also celebrates the achievement of the late Dr. James A. Van Allen and his science team and all of the individuals at the Jet Propulsion Laboratory and Army Ballistic Missile Agency who, through the successful launch of Explorer I, brought the United States into the space age and science into the realm of space.

The next 50 years of United States accomplishments in outer space will rely on individuals possessing strong mathematics, science, and engineering skills and the educators who will train such individuals enabling the development of advanced technologies, skills, and capabilities that support United States competitiveness and economic growth. Therefore, the resolution also supports science, technology, engineering, and mathematics education programs, which are critical for preparing the next generation to lead future United States space endeavors.

The resolution also recognizes the role of the United States space program in strengthening the scientific and engineering foundation that contributes to United States innovation and economic growth and looks forward to the next 50 years of United States achievements in the robotic and human exploration of space.

Legislative History

On January 29, 2008, Representative Mark Udall and six co-sponsors introduced H.Con.Res. 287 which was referred to the Committee on Science and Technology. On February 6, 2008, the resolution was discharged from the Committee on Science and Technology and the resolution passed the House of Representatives by voice vote. On February 7, 2008, the resolution was received in the Senate and referred to the Committee on Commerce, Science, and Transportation.

3.9—H.CON.RES. 366, EXPRESSING THE SENSE OF CONGRESS THAT INCREASING AMERICAN CAPABILITIES IN SCIENCE, MATHEMATICS, AND TECHNOLOGY EDUCATION SHOULD BE A NATIONAL PRIORITY

Background and Summary of the Legislation

H.Con.Res. 366 expresses the sense of Congress that increasing American capabilities in science, mathematics, and technology education should be a national priority since the economic competitiveness of the Nation depends on strong science, mathematics, and technology capabilities throughout the workforce. It states that our

national competitiveness strategy must include the goals of ensuring that all young persons achieve a level of technological literacy adequate to prepare them for the demands of a scientific and technologically oriented society and fulfilling the need for a deep pool of talented American leaders in science and technological research and development. Numerous research reports indicate the Nation is not achieving these goals.

The most recent United States National Assessment of Educational Progress reveals that a majority of those 17 years of age are poorly equipped for informed citizenship and productive performance in the workplace and while women and minorities continue to be under-served by and under-represented in science and mathematics, by 2016, 35.4 percent of our workforce will be comprised of minority workers, and 46.6 percent will be women.

Therefore, the Congress finds that this Nation should dedicate its resources to the development of a broad pool of citizens who are functionally literate in science, mathematics, and technology. Furthermore, it declares that a national science education policy in the coming decade should address the crucial need areas of substantially increasing science scholarships and providing adequate financial resources to permit students from under-represented populations to study science, mathematics, and technology and actively involving National Science Foundation involvement in curriculum development with strong emphasis on reinforcing science and mathematics concepts at each grade level. It finds that this national challenge can be met through strong leadership from the White House Office of Science and Technology Policy; other Federal, State, and local governments; and with long-term commitments from the civic, business, and engineering communities.

Legislative History

On June 3, 2008, H.Con.Res. 366 was introduced by Congresswoman Eddie Bernice Johnson and eight co-sponsors and was referred to the House Committee on Science and Technology. On June 4, 2008 the resolution was discharged from the Committee on Science and Technology and passed the House of Representatives by voice vote under suspension of the rules. On June 5, 2008 the resolution was received in the Senate and referred to the Committee on Health, Education, Labor, and Pensions.

3.10—H.CON.RES. 375, TO HONOR THE GOAL OF THE INTERNATIONAL YEAR OF ASTRONOMY, AND FOR OTHER PURPOSES

Background and Summary of the Legislation

H.Con.Res. 375 promotes the goal of the International Year of Astronomy. The year 2009 represents the 400th Anniversary of Galileo's astronomical use of the telescope and has been designated the International Year of Astronomy (IYA) by the United Nations and UNESCO.

Astronomy is one of the oldest basic sciences and contributes fundamentally to the ultimate context of all other sciences. Astronomical observations and discoveries have profound implications for the development of science, philosophy, culture, and our general con-

ception of our place in the Universe. Astronomy and astronomical discoveries continue to capture the imagination of the American people.

The United States is the home of the most advanced astronomical research in the world. The many creative programs and activities planned in the United States for IYA 2009 are strongly supported by the staff, missions, and observatories of the National Science Foundation and the National Aeronautics and Space Administration.

Therefore, the resolution honors the goal of the International Year of Astronomy to celebrate astronomical discoveries, encourages the public to participate in IYA celebrations and activities and discover more about the Universe and the science of astronomy, and applauds the efforts of the employees, centers, and laboratories of the National Aeronautics and Space Administration and the National Science Foundation in promoting public understanding of the astronomical sciences during the celebration of the International Year of Astronomy.

Legislative History

On June 20, 2008, Representative Gabrielle Giffords introduced H.Con.Res. 375, which was referred to the House Committee on Science and Technology. On July 9, 2008 the resolution was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by voice vote under suspension of the rules.

On July 10, 2008, the resolution was received in the Senate and referred to the Committee on Commerce, Science, and Transportation. On July 31, 2008, the resolution was ordered reported by the Committee on Commerce, Science, and Transportation.

3.11—H.RES. 59, SUPPORTING THE GOALS AND IDEALS OF NATIONAL ENGINEERS WEEK

Background and Summary of the Legislation

Through H.Res. 59, the House of Representatives supports the goals and ideals of National Engineers Week and its aims to increase understanding of and interest in engineering and technology careers and to promote literacy in math and science and commits the House of Representatives to work with the engineering community to make sure that the creativity and contribution of that community can be expressed through research, development, standardization, and innovation.

Legislative History

H.Res. 59 was introduced January 12, 2007 by Congressman Lipinski and referred to the Committee on Science and Technology. On January 24, 2007 the Committee on Science and Technology considered H.Res. 59 and ordered it reported by unanimous voice vote. On January 29, 2007, the resolution was reported by the Committee on Science and Technology (H.Rept. 110–5) and placed on the House Calendar. On January 30, 2007, the House considered H.Res. 59 under suspension of the rules and on January 31, 2007 passed the resolution 417–0.

3.12—H.RES. 72, RECOGNIZING THE WORK AND ACCOMPLISHMENTS OF MR. BRITT ‘MAX’ MAYFIELD, DIRECTOR OF THE NATIONAL HURRICANE CENTER’S TROPICAL PREDICTION CENTER UPON HIS RETIREMENT

Background and Summary of the Legislation

Through H.Res. 72, the House of Representatives honors Mr. Britt ‘Max’ Mayfield’s commitment to improving the accuracy of hurricane forecasting as Director of the National Hurricane Center’s Tropical Prediction Center, thanks Mr. Mayfield for his service, commends Mr. Mayfield’s dedication to expanding educational opportunities for State and local emergency management officials, acknowledges the critical role that Mr. Mayfield has played in forecast and service improvements, and recognizes the support and work of the staff of the National Hurricane Center’s Tropical Prediction Center during Mr. Mayfield’s tenure as Director of the Center.

Legislative History

H.Res. 72 was introduced on January 17, 2007 by Congressman Mahoney and referred to the House Committee on Science and Technology. On January 31, 2007, the Committee marked up H.Res. 72 and ordered it reported by voice vote. On February 7, 2007, the resolution was passed by the House of Representatives under suspension of the rules.

3.13—H.RES. 252, RECOGNIZING THE 45TH ANNIVERSARY OF JOHN HERSCHEL GLENN, JR.’S HISTORIC ACHIEVEMENT IN BECOMING THE FIRST UNITED STATES ASTRONAUT TO ORBIT THE EARTH

Background and Summary of the Legislation

Through H.Res. 252, the House of Representatives honors the 45th anniversary of John Herschel Glenn, Jr.’s landmark mission piloting the first manned orbital mission of the United States and recognizes the profound importance of John Glenn’s achievement as a catalyst to space exploration and scientific advancement in the United States.

Legislative History

H.Res. 252 was introduced on March 15, 2007 by Congressman Space and referred to the House Committee on Science and Technology. On March 28, 2007, the Committee on Science and Technology marked up H.Res. 252 and ordered it reported by a unanimous voice vote. On May 1, 2007, the House of Representatives passed H.Res. 252 a voice vote under suspension of the rules.

3.14—H.RES. 316, CONGRATULATING THE ACHIEVEMENT OF
ROGER D. KORNBERG, ANDREW FIRE, CRAIG MELLO,
JOHN C. MATHER, AND GEORGE F. SMOOT FOR BEING
AWARDED NOBEL PRIZES IN SCIENCE

Background and Summary of the Legislation

Through H.Res. 316, the House of Representatives recognizes Roger D. Kornberg, Andrew Fire, Craig Mello, John C. Mather, and George F. Smoot for advancing scientific discovery and dedicating their careers to scientific research leading to their being awarded Nobel Prizes in science and recognizes the National Science Foundation and the National Aeronautics and Space Administration for their support of the physics Nobel Prize winners.

Legislative History

This resolution was introduced April 18, 2007 by Congressman McNerney and referred to the House Committee on Science and Technology. On April 24, 2007, the Committee considered H.R. 2007 and ordered it reported by voice vote. On May 1, 2007 the House of Representatives passed the bill by voice vote under suspension of the rules.

3.15—H.RES. 402, EXPRESSING SUPPORT FOR THE GOALS
AND IDEALS OF NATIONAL HURRICANE PREPAREDNESS
WEEK

Background and Summary of the Legislation

Through H.Res. 402, the House of Representatives supports the goals and ideals of National Hurricane Preparedness Week; encourages the staff of the National Oceanic and Atmospheric Administration, especially at the National Weather Service and the National Hurricane Center, to continue their outstanding work to educate people in the United States about hurricane preparedness; and urges the people of the United States to recognize such a week as an opportunity to learn more about the work of the National Hurricane Center to forecast hurricanes and to educate citizens about the potential risks associated with hurricanes.

Legislative History

H.Res. 402 was introduced by Congressman Mario Diaz-Balart on May 15, 2007 and was referred to the House Committee on Science and Technology. On May 21, 2007 the resolution passed the House of Representatives under suspension of the rules.

3.16—H.RES. 421, HONORING THE TRAILBLAZING ACCOM-
PLISHMENTS OF THE ‘MERCURY 13’ WOMEN, WHOSE EF-
FORTS IN THE EARLY 1960S DEMONSTRATED THE CAPA-
BILITIES OF AMERICAN WOMEN TO UNDERTAKE THE
HUMAN EXPLORATION OF SPACE

Background and Summary of the Legislation

Through H.Res. 421, the House of Representatives recognizes and honors the contributions of Myrtle Cagle, Geraldyn ‘Jerrie’ Cobb, Jan Dietrich, Marion Dietrich, Mary Wallace ‘Wally’ Funk,

Jane Briggs Hart, Jean Hixson, Gene Nora Stumbough Jessen, Irene Leverton, Sarah Lee Gorelick Ratley, Bernice Trimble Steadman, Geraldine 'Jerri' Sloan Truhill, and Rhea Hurrle Allison Woltman; and encourages young women to follow in the footsteps of the Mercury 13 women and pursue careers of excellence in aviation and astronautics, as well as in engineering and science.

Legislative History

H.Res. 421 was introduced on May 21, 2007 and referred to the House Committee on Science and Technology. On June 6, 2007, the resolution passed the House of Representatives under suspension of the rules.

3.17—H.RES. 446, HONORING THE LIFE AND ACCOMPLISHMENTS OF ASTRONAUT WALTER MARTY SCHIRRA AND EXPRESSING CONDOLENCES ON HIS PASSING

Background and Summary of the Legislation

Through H.Res. 446, the House of Representatives honors the life and accomplishments of Astronaut Walter Marty Schirra and expresses condolences on his passing and recognizes the profound importance of Astronaut Schirra's record as a pioneer in space exploration and long-time contributor to NASA's mission as a catalyst to space exploration and scientific advancement in the United States.

Legislative History

This resolution was introduced May 5, 2007 by Congressman Kagen and was referred to the House Committee on Science and Technology. On June 6, 2007 the bill was passed by the House of Representatives under suspension of the rules.

3.18—H.RES. 487, RECOGNIZING THE CONTRIBUTION OF MODELING AND SIMULATION TECHNOLOGY TO THE SECURITY AND PROSPERITY OF THE UNITED STATES, AND RECOGNIZING MODELING AND SIMULATION AS A NATIONAL CRITICAL TECHNOLOGY

Background and Summary of the Legislation

Through H.Res. 487, the House of Representatives commends those who have contributed to the modeling and simulation efforts which have developed essential characteristics of our nation; urges that, consistent with previous legislation passed by this and previous Congresses, science, technology, engineering, and mathematics remain key disciplines for primary and secondary education; encourages the expansion of modeling and simulation as a tool and subject within higher education; recognizes modeling and simulation as a National Critical Technology; affirms the need to study the national economic impact of modeling and simulation; supports the development and implementation of governmental classification codes that include separate classification for modeling and simulation occupations; and encourages the development and implementation of ways to protect intellectual property of modeling and simulation enterprises.

Legislative History

H.Res. 487 was introduced June 14, 2007 by Congressman Randy Forbes and was referred to the House Committee on Science and Technology. On June 22, 2007, H.Res. 487 was considered by the Committee and ordered reported by a voice vote. On July 16, 2007 the resolution passed the House of Representatives by voice vote.

3.19—H.RES. 593, CONGRATULATING SCIENTISTS F. SHERWOOD ROWLAND, MARIO MOLINA, AND PAUL CRUTZEN FOR THEIR WORK IN ATMOSPHERIC CHEMISTRY, PARTICULARLY CONCERNING THE FORMATION AND DECOMPOSITION OF OZONE, THAT LED TO THE DEVELOPMENT OF THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE OZONE LAYER

Background and Summary of the Legislation

Through H.Res. 593, the House of Representatives congratulates scientists F. Sherwood Rowland, Mario Molina, and Paul Crutzen for their work in atmospheric chemistry, particularly concerning the formation and decomposition of ozone, that led to the development of the Montreal Protocol on Substances that Deplete the Ozone Layer; and encourages the continued research of the interaction of humans and their actions with the Earth's ecosystem.

Legislative History

H.Res. 593 was introduced by Congresswoman Loretta Sanchez on July 17, 2007. On September 17, 2007, it passed the House of Representatives by a voice vote.

3.20—H.RES. 716, EXPRESSING THE SENSE OF CONGRESS WITH RESPECT TO RAISING AWARENESS AND ENHANCING THE STATE OF COMPUTER SECURITY IN THE UNITED STATES, AND SUPPORTING THE GOALS AND IDEALS OF NATIONAL CYBER SECURITY AWARENESS MONTH

Background and Summary of the Legislation

The National Cyber Security Alliance has designated October as National Cyber Security Awareness Month. Through H.Res. 716, the House of Representatives supports the goals and ideals of National Cyber Security Awareness Month including educating United States citizens about computer security.

More than 200,000,000 American adults use the Internet in the United States, 70 percent of whom connect through broadband connections, to communicate with family and friends, manage finances and pay bills, access educational opportunities, shop at home, participate in online entertainment and games, and stay informed of news and current events. United States small businesses increasingly rely on the Internet to manage their businesses, expand their customer reach, and enhance their connection with their supply chain. Nearly 100 percent of public schools in the United States have Internet access, with a significant percentage of instructional rooms connected to the Internet to enhance children's education by providing access to educational online content and encouraging self-initiative to discover research resources. The growth and popu-

larity of social networking websites has attracted millions of teenagers, providing access to a range of valuable services, making it all the more important to teach teenaged users how to avoid potential threats like cyber bullies, predators, and identity thieves they may come across while using such services.

Cyber security is a critical part of the Nation's overall homeland security. The Nation's critical infrastructures rely on the secure and reliable operation of information networks to support the Nation's financial services, energy, telecommunications, transportation, health care, and emergency response systems. Internet users and information infrastructure holders face an increasing threat of malicious attacks through viruses, worms, Trojans, and unwanted programs such as spyware, adware, hacking tools, and password stealers, that are frequent and fast in propagation, are costly to repair, and can cause extensive economic harm. Coordination between the numerous Federal agencies involved in cyber security efforts, including the Department of Homeland Security, the National Institute of Standards and Technology, the National Science Foundation, and others is essential to securing America's critical cyber infrastructure.

Millions of records containing personally-identifiable information have been lost, stolen or breached, threatening the security and financial well-being of United States citizens, so consumers face significant financial and personal privacy losses due to identity theft and fraud.

Therefore, the Congress intends to work with federal agencies, national organizations, businesses, and educational institutions to encourage the voluntary development and use implementation of existing and future computer security voluntary consensus standards, practices, and technologies in order to enhance the state of computer security in the United States.

Legislative History

On October 9, 2007, Representative Langevin and nine co-sponsors introduced H.Res. 716, which was referred to the House Committee on Science and Technology. On October 16, 2007, the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by voice vote under suspension of the rules.

3.21—H.RES. 736, HONORING THE 60TH ANNIVERSARY OF THE AERONAUTICS RESEARCH ACCOMPLISHMENTS EMBODIED IN "THE BREAKING OF THE SOUND BARRIER"

Background and Summary of the Legislation

Through H.Res. 736, the House of Representatives recognizes and honors the contributions of the scientists and engineers of NACA and its partners who pioneered the technologies to enable supersonic flight, recognizes and honors the bravery of Charles Yeager, and the bravery of the many other test pilots who, sometimes at the cost of their lives, enabled the aeronautics developments that made that first supersonic flight possible; and recognizes the importance of strong and robust aeronautics research activities to the well being of America.

The National Advisory Committee for Aeronautics (NACA), and its successor agency, the National Aeronautics and Space Administration (NASA), developed and sustained the world's preeminent aeronautics research program after NACA's formation in 1915.

The speed of sound once presented a seemingly impenetrable and dangerous barrier to piloted flight, leading NACA, the U.S. Air Force, and Bell Aircraft to undertake a joint project to develop and test the X-1 aircraft and achieve piloted supersonic flight.

On the morning of October 14, 1947, an X-1 aircraft piloted by Captain Charles 'Chuck' Yeager was dropped from a B-29 carrier aircraft and 'broke the sound barrier' and achieved supersonic flight for the first time in history. This flight provided proof of the feasibility of piloted supersonic flight, and delivered the data required to improve high speed performance and develop technologic accomplishments of the X-1 aircraft and achieved advances in a wide range of aeronautics research areas.

Legislative History

On October 12, 2007, Representative Rohrabacher and nine co-sponsors introduced H.Res. 736, which was referred to the House Committee on Science and Technology. On October 16, 2007, the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by voice vote under suspension of the rules.

3.22—H.RES. 751, SUPPORTING THE GOALS AND IDEALS OF NATIONAL CHEMISTRY WEEK

Background and Summary of the Legislation

Through H.Res. 751, the House of Representatives recognizes that the important contributions of chemical scientists and engineers to technological progress and the health of many industries have created new jobs, boosted economic growth, and improved the Nation's health and standard of living; recognizes the need to increase the number of Americans from under-represented groups participating in science and technology fields like chemistry; and supports the goals of National Chemistry Week as founded by the American Chemical Society; and encourages the people of the United States to observe National Chemistry Week with appropriate recognition, ceremonies, activities, and programs to demonstrate the importance of chemistry to our everyday lives.

Chemistry is a vitally important field of science and technology that has transformed the world and enhanced and improved the quality of life around the globe. The power of the chemical sciences has created the enabling infrastructure that delivers the foods, fuels, medicines and materials that are the hallmarks of modern life. The contributions of chemical scientists and engineers are central to technological progress and to the health of many industries, including the chemical, pharmaceutical, electronics, agricultural, automotive, and aerospace sectors, and these contributions boost economic growth, create new jobs, and improve our health and standard of living. The American Chemical Society, the world's largest scientific society, founded National Chemistry Week in 1987 to educate the public, particularly school age children, about the

important role of chemistry in society and to enhance the appreciation of the chemical sciences.

October 22, 2007 marks the 20th anniversary of National Chemistry Week when more than 10,000 National Chemistry Week volunteers from industry, government and academia reach and educate millions of children through hands-on science activities in local schools, libraries, and museums. The theme of National Chemistry Week in 2007, 'The Many Faces of Chemistry,' was chosen to emphasize the extensive variety of careers available in the world of chemistry and to honor the tremendous diversity of people who have contributed and will contribute to the advancement of chemistry and all of its branches. In order to ensure our nation's global competitiveness, our schools must cultivate the finest scientists, engineers, and technicians from every background and neighborhood in our society to create the innovations of tomorrow that will keep our nation strong. Yet a disproportionately low number of minority, underprivileged female students are pursuing careers in science and technology, and it is crucial that we focus attention on increasing the participation of these under represented groups in science and technology fields.

Legislative History

On October 16, 2007, Representative Reyes and 12 co-sponsors introduced H.Res. 751, which was referred to the House Committee on Science and Technology. On October 22, 2007, the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by voice vote under suspension of the rules.

3.23—H.RES. 891, CELEBRATING 35 YEARS OF SPACE-BASED OBSERVATIONS OF THE EARTH BY THE LANDSAT SPACECRAFT AND LOOKING FORWARD TO SUSTAINING THE LONGEST UNBROKEN RECORD OF CIVIL EARTH OBSERVATIONS OF THE LAND

Background and Summary of the Legislation

Through H.Res. 891, the House of Representatives expresses its appreciation to all of the dedicated scientists, engineers, and program personnel who have contributed to the successful development and operation of the Landsat program over the past 35 years; looks forward to another 35 years of continuous Landsat-like observations of the Earth; urges the continuation of the Landsat program and data record so as to sustain Landsat's value to scientific research, especially the study of global and climate change, and to the myriad applied uses of the data for societal benefit; and believes that the Nation should continue to support the research, technological improvements, educational outreach, and development of decision-making tools required to expand the use of Landsat data separately and as integrated with other Earth observations data.

The year 2007 represents 35 years of continuous collection of space-based observations of the Earth's land cover by the United States Landsat satellites, which have enabled increased scientific understanding of the interrelationships of the Earth's land cover,

energy balance, and biogeochemical processes as well as the realization of numerous societal benefits from the applied uses of the data. On July 23, 1972, the National Aeronautics and Space Administration launched Landsat 1, originally called the Earth Resources Technology Satellite, as the first civilian Earth observation satellite to study the Earth's land cover and monitor natural resources. Since 1972, the United States Geological Survey has led the data archiving and distribution efforts for the Landsat program, which has continued to collect data without interruption through the successful launches of Landsats 2, 3, 4, 5, and 7, and has established the longest and most comprehensive record of global land surface data ever collected. Landsat greatly enhanced remote sensing science, helped give rise to a global change research plan and international initiatives to study the Earth system, and led to new types of careers in engineering and natural sciences. Landsat data have been used for multiple scientific and applied purposes including cartography, land surveys and land use planning, agricultural forecasting, water resource management, forest management, mapping of sea ice movement, assessment of tropical deforestation, food security, mineral and oil exploration, and global change research. Landsat data are collected at a scale that enables the study of both natural and human-induced changes in land cover over time and their impacts on the Earth's ecosystems. The U.S. Climate Change Science Program has recognized Landsat and its long-term data record as instrumental to the study of climate and environmental change, noting that 'Landsat data are invaluable for studying the land surface and how it affects and is affected by climate.'

Legislative History

On December 18, 2007, Representative Mark Udall and three other Members introduced H.Res. 891, which was referred to the House Committee on Science and Technology. On April 22, 2008 the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by voice vote under suspension of the rules.

3.24—H.RES. 907, CONGRATULATING THE X PRIZE FOUNDATION'S LEADERSHIP IN INSPIRING A NEW GENERATION OF VIABLE, SUPER-EFFICIENT VEHICLES

Background and Summary of the Legislation

H.Res. 907 congratulates the X PRIZE Foundation's leadership for inspiring a new generation of viable, super-efficient vehicles that help break our addiction to oil through the Automotive X PRIZE competition, congratulates the X PRIZE Foundation on their innovation and vision to bring together some of the finest minds in the public and private sectors, including government, academia, and industry, to advise and participate in the Automotive X PRIZE competition, and applauds the X PRIZE Foundation's ongoing commitment to find solutions to some of humanity's greatest challenges as exemplified in the Automotive X PRIZE.

The United States is heavily dependent on foreign sources of oil that are concentrated in tumultuous countries and regions. The na-

tional security and economic prosperity of the United States demand that we move toward a sustainable energy future. The ability of foreign governments to assert great control over oil production allows unfriendly regimes to use energy exports as leverage against the United States and our allies. The continued reliance on the use of greenhouse gas intensive fuels may impact global climate change. The automotive sector is heavily dependent on oil, which makes Americans vulnerable to oil price fluctuation and is a major source of greenhouse gas emissions.

Many promising technologies exist that can lead to a breakthrough vehicle that will meet the need for sustainable transportation. The breakthroughs are often achieved by the free market fueling the entrepreneurial spirit of inventors and investors. The Automotive X PRIZE is a private, independent, technology-neutral competition being developed by the X PRIZE Foundation to inspire a new generation of viable, super-efficient vehicles that help break our addiction to oil and stem the effects of climate change. The Automotive X PRIZE will award a multi-million dollar reward to teams that can design, build, and demonstrate production-capable vehicles that achieve 100 MPG or its equivalent.

Legislative History

On December 19, 2007, Representative Dan Lungren and two cosponsors introduced H.Res. 907, which was referred to the House Committee on Science and Technology. On February 6, 2008 the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by voice vote under suspension of the rules.

3.25—H.RES. 917, SUPPORTING THE GOALS AND IDEALS OF NATIONAL ENGINEERS WEEK, AND FOR OTHER PURPOSES

Background and Summary of the Legislation

Through H.Res. 917, the House of Representatives supports the goals and ideals of National Engineers Week and its aim to increase understanding of and interest in engineering and technology careers and to promote literacy in science, technology, engineering, and mathematics and will work with the engineering community to make sure that the creativity and contribution of that community can be expressed through research, development, standardization, and innovation.

The National Engineers Week has grown into a formal coalition of more than 75 professional societies, major corporations, and government agencies, dedicated to ensuring a diverse and well-educated future engineering workforce by increasing understanding of and interest in engineering and technology careers among all young students, by promoting pre-college literacy in science, technology, engineering, and mathematics (STEM), and raising public understanding and appreciation of engineers' contributions to society.

The February 17–23, 2008, has been designated by the President as National Engineers Week and the theme is 'Engineers Make a World of Difference.' The National Engineers Week, which was founded in 1951 by the National Society of Professional Engineers,

is among the oldest of America's professional outreach efforts. The National Engineers Week is celebrated during the week of George Washington's birthday to honor the contributions that our first President, a military engineer and land surveyor, made to engineering. The during National Engineers Week, more than 45,000 engineers connect with some 5,500,000 students and teachers in kindergarten through high school as they help students and teachers determine practical applications of their academics and help students discover that STEM subjects can be fun.

Engineers have helped meet the major technological challenges of our time—from rebuilding towns devastated by natural disasters to designing an information superhighway that will speed our country into the future. Engineers are a crucial link in research, development, and demonstration in transforming scientific discoveries into useful products, and we will look more than ever to engineers and their knowledge and skills to meet the challenges of the future. Engineers play a crucial role in developing the consensus engineering standards that permit modern economies and societies to exist. The 2006 National Academy of Sciences report entitled *'Rising Above the Gathering Storm'* highlighted the worrisome trend that fewer students are now focusing on engineering in college at a time when increasing numbers of today's 2,000,000 United States engineers are nearing retirement.

Legislative History

H.Res. 917 was introduced on January 15, 2008 by Representative Lipinski and 19 co-sponsors and referred to the House Committee on Science and Technology. On February 13, 2008, the Committee on Science and Technology was discharged from further consideration of the resolution and H.Res. 917 was passed the House of Representatives under suspension of the rules by a vote of 408–0.

3.26—H.RES. 943, REMEMBERING THE SPACE SHUTTLE CHALLENGER DISASTER AND HONORING ITS CREW MEMBERS, WHO LOST THEIR LIVES ON JANUARY 28, 1986

Background and Summary of the Legislation

Through H.Res. 943, the House of Representatives honors the 22nd anniversary of the Space Shuttle *Challenger* disaster, celebrates the courage and bravery of the crew of the *Challenger*, and Christa McAuliffe and her passion for encouraging America's children to pursue careers in science and mathematics, commits itself and the Nation to using the lessons learned in inquiries into the Space Shuttle *Challenger* accident to ensure that the space agency always operates on a strong and stable foundation, and recognizes the continued dedication of the United States to the goal of space exploration for the benefit of all mankind.

January 28, 2008, marks the 22-year anniversary of the tragic accident of the Space Shuttle *Challenger*, Mission 51-L, and the loss of seven of America's bravest and most dedicated citizens. The Space Shuttle *Challenger* disaster occurred off the coast of central Florida, at 11:39 a.m. on January 28, 1986. The Space Shuttle *Challenger* disintegrated 73 seconds into its flight after an O-ring

seal in its right solid rocket booster failed at lift-off. The seven-person crew on the Shuttle included Commander Francis R. Scobee, Pilot Michael J. Smith, Mission Specialist Judith A. Resnik, Mission Specialist Ellison S. Onizuka, Mission Specialist Ronald E. McNair, Payload Specialist Gregory B. Jarvis, and Payload Specialist Sharon Christa McAuliffe. Christa McAuliffe, a schoolteacher from Concord, New Hampshire, was on board as the first member in the Teacher in Space Project. The National Aeronautics and Space Administration (NASA) selected Christa McAuliffe from a field of 11,000 applicants to be a part of the *Challenger* crew and teach lessons to school children from space. The Committee on Science and Technology of the House of Representatives conducted oversight hearings on the *Challenger* disaster and released a report on October 29, 1986, on the causes of the accident. The House of Representatives continues to support NASA and its ongoing efforts to explore and educate the American public about space.

Legislative History

On January 28, 2008, Representative Hodes and sixty co-sponsors introduced H.Res. 943, which was referred to the House Committee on Science and Technology. On February 6, 2008 the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by voice vote under suspension of the rules.

3.27—H.RES. 966, HONORING AFRICAN AMERICAN INVENTORS, PAST AND PRESENT, FOR THEIR LEADERSHIP, COURAGE, AND SIGNIFICANT CONTRIBUTIONS TO OUR NATIONAL COMPETITIVENESS

Background and Summary of the Legislation

Through H.Res. 966, the United States House of Representatives recognizes and appreciates the significant achievements to our national research enterprise made by African-American and other minority scientists, technologists, engineers, and mathematicians; honors and extends its appreciation and gratitude toward all African-American inventors, for the significant and honorable research and educational contributions that improve the lives of all citizens and that have gone unacknowledged too long; and looks for opportunities to make sure that the creativity and contribution of minority scientists, technologists, engineers, and mathematicians can be expressed through research, development, standardization, and innovation.

The African-American and other minority scientists, technologists, engineers, and mathematicians have made significant achievements in our national research enterprise and inspired future generations. The National Society of Black Engineers (NSBE) lifts up African-American researchers of the past and present, including special contributors named in this Resolution.

Garrett Augustus Morgan made outstanding contributions to public safety. The firefighters in the early 1900s wore the safety helmets and gas masks that he invented, and for which he was awarded a gold medal at the Second International Exposition of Safety and Sanitation in New York in 1914. Two years later, he

himself used the mask to rescue men trapped by a gas explosion in a tunnel being constructed under Lake Erie.

Following the disaster which took 21 lives, the City of Cleveland honored him with a gold medal for his heroic efforts. In 1923, he received a patent for a traffic signal to regulate vehicle movement in city areas, and this device was a direct precursor to the modern traffic light in use today.

Ernest Everett Just was a trailblazer in the fields of cell biology and zoology. His research and papers on marine biology were so well received in 1915 that Ernest Everett Just was awarded the first Spingarn Medal by the National Association for the Advancement of Colored People at age 32. Ernest Everett Just dedicated years of research toward the study of cells and cell structures in order to understand and find cures for cellular irregularities and diseases such as sickle cell anemia and cancer and became one of the most respected scientists in his field. Racial bigotry in the United States caused much of his work and his achievements to go unrewarded. In other countries, he was treated as a pioneer and was recruited to work with Russian scientists and invited to be a guest researcher at the Kaiser Wilhelm Institute for Biology, the world's greatest scientific research laboratory at the time. He was welcomed at the Naples Zoological Station in Italy and the Sorbonne in France, where he conducted research and was regarded as one of the most outstanding zoologists of his time.

Archibald Alphonso Alexander excelled in design and construction engineering. Employed by the Marsh Engineering Company, he designed the Tidal Basin bridge in Washington, DC. After studying bridge design in London, Archibald Alphonso Alexander and George Higbee formed a general contracting business that focused on bridge design. His designs include Washington, DC's Whitehurst Freeway, the heating plant and power station at the University of Iowa, and an airfield in Tuskegee, Alabama. He went on to become the first Republican territorial governor of the U.S. Virgin Islands.

David Nelson Crosthwait Jr. made significant and practical contributions to the engineering of heating and cooling systems. He held numerous patents relating to heat transfer, ventilation, and air conditioning, the areas in which he was considered an expert. David Nelson Crosthwait Jr. served as Director of research laboratories for C.A. Dunham Company in Marshalltown, Iowa, where he served as technical advisor from 1930 to 1970. He designed the heating systems for Radio City Music Hall and Rockefeller Center in New York City and authored texts and guides on heating and cooling with water. During the 1920s and 1930s, he invented an improved boiler, a new thermostat control, and a new differential vacuum pump to improve the heating systems in larger buildings.

African-American innovators continue to improve the daily lives of Americans through their inventions and stir the creative spirit of future generations.

Legislative History

On February 7, 2008, Representative Eddie Bernice Johnson and 19 co-sponsors introduced H.Res. 966, which was referred to the House Committee on Science and Technology. On February 13,

2008 the bill was discharged from the House Committee on Science and the House of Representatives considered the resolution under suspension of the rules. On February 14, 2008, the resolution passed the House of Representatives by a vote of 387–0.

3.28—H.RES. 1112, RECOGNIZING 2008 AS THE INTERNATIONAL YEAR OF THE REEF

Background and Summary of the Legislation

Through H.Res. 1112, United States House of Representatives recognizes the International Year of the Reef; supports strong programs in environmental and marine research at the National Oceanic and Atmospheric Administration and other federal agencies to better understand the threats faced by coral reef systems; supports the efforts of the International Coral Reef Initiative to promote public awareness and encourage public stewardship of the world's coral reefs; and encourages further research and development efforts to preserve coral reefs around the world.

The International Coral Reef Initiative has designated 2008 as the International Year of the Reef. The International Year of the Reef is a global effort to raise public awareness of the value of coral reefs and the significance of the threats faced by coral reef systems, and to mobilize action to develop and implement innovative solutions and strategies to protect and conserve these important natural resources.

Over 225 organizations in 50 countries and territories participated during the first International Year of the Reef in 1997. Coral reef systems provide economic, environmental, and cultural benefits to millions of people around the world and are vital in protecting shorelines and supporting coastal economies. Coral reef systems are the most diverse ecosystem on earth, supporting at least 1,000,000 known species of plants and animals and 25 percent of all marine life. Over 50 percent of all federally managed fisheries species in the U.S. depend upon coral reefs for part of their life cycle. Coral reef systems provide for one-fourth of the total fish catch in the developing world. Coral reefs around the world are confronted by many grave threats, including destructive fishing methods, damage by marine vessels and divers, development, pollution, ocean acidification, increasing sea temperatures, bleaching, and invasive species. Increased public awareness, as well as public and private investment, can prevent the further degradation of the world's coral reef systems in order to preserve this precious resource for future generations:.

Legislative History

On April 16, 2008, Representative Brian Baird and five co-sponsors introduced H.Res. 1112, which was referred to the House Committee on Science and Technology. On April 22, 2008 the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by voice vote under suspension of the rules.

3.29—H.RES. 1117, DECLARING THE SUPPORT OF THE HOUSE OF REPRESENTATIVES FOR THE GOALS AND IDEALS OF EARTH DAY AND FOR DEVELOPING THE SCIENTIFIC AND TECHNOLOGICAL CAPABILITIES TO ACHIEVE THOSE GOALS

Background and Summary of the Legislation

Through H.Res. 1117, the House of Representatives supports the goals and ideals of Earth Day and thanks the many organizers and participants across the country for their tireless efforts in support of the environment; encourages the Department of Energy to step up its efforts in research, development, and demonstration of renewable energy technology and energy conservation techniques; and encourages all segments of American society to work together in ensuring that the research and development necessary to uncover solutions to our major environmental problems occurs in a timely manner.

The need to educate Americans on the importance of stewardship of the environment led to the first Earth Day in 1970, the passage of a variety of environmental laws, and substantial environmental improvements over the intervening years. Substantial air quality and other environmental problems persist in many areas of our country. Today increasing numbers of Americans are concerned with the relatively rapid changes in our environment and decreasing biodiversity. The need to improve our interaction with the environment has led to the need for more sophisticated environmental research and development of solutions to environmental problems. Today the importance of scientific evidence in making correct decisions about environmental problems has never been more important.

Earth Day activities increase our understanding of the environment and its relationship to our personal decisions regarding energy conservation, use of renewable energy, use of natural resources, and recycling. Earth Day has become the preeminent day of environmental celebrations, clean-ups, and educational events across the country:

Legislative History

On April 17, 2008, Representative Jerry McNerney introduced H.Res. 1117, which was referred to the House Committee on Science and Technology. On April 22, 2008 the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by voice vote under suspension of the rules.

3.30—H.RES. 1118, HONORING THE LIFE AND ACHIEVEMENTS OF JOHN ARCHIBALD WHEELER AND EXPRESSING CONDOLENCES ON HIS PASSING

Background and Summary of the Legislation

Through H.Res. 1119, the House of Representatives honors the life and accomplishments of Professor John Archibald Wheeler and expresses condolences on his passing and recognizes the profound importance of Dr. Wheeler's record as a pioneer in nuclear and the-

oretical physics and a long-time contributor to advancing mankind's understanding of the nature and workings of the universe.

John Archibald Wheeler was born July 9, 1911, in Jacksonville, Florida, graduated from high school at age 15, and earned a Ph.D. in physics from Johns Hopkins University at age 21. He then moved to Copenhagen to work in the field of nuclear physics with pioneering physicist Niels Bohr. While still in his 20s, Dr. Wheeler, then a Professor of Physics at Princeton, along with Dr. Bohr in 1939 worked out the first explanation of how the newly discovered nuclear fission actually worked. He spent the war years at Hanford, Washington working on the theoretical understanding of nuclear reactions that led to production of plutonium for the bomb dropped on Nagasaki and later worked on the development of the American hydrogen bomb under Project Matterhorn B. He then returned to Princeton where, after discussion with Albert Einstein, he switched from the study of nuclear physics to working on extending the theory of general relativity, including in 1957 creating the concept of wormholes to describe tunnels in space-time and in 1967 coining the term black hole as part of the theory of gravitational waves. Dr. Wheeler was a visionary who could see farther on the horizon than most people by way of his physical intuition. Dr. Wheeler was a beloved academic who trained some of the best minds in the next generation of physicists, a gifted communicator sometimes called a physics poet, and an active researcher for over 70 years. Dr. Wheeler was, in the words of Dr. Max Texmark, the last Titan, the only physics superhero still standing until the time of his death on April 13, 2008.

Legislative History

On April 17, 2008, Representative Bill Foster introduced H.Res. 1118, which was referred to the House Committee on Science and Technology. On June 4, 2008, the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by voice vote under suspension of the rules.

3.31—H.RES. 1180, RESOLUTION RECOGNIZING THE EFFORTS AND CONTRIBUTIONS OF OUTSTANDING WOMEN SCIENTISTS, TECHNOLOGISTS, ENGINEERS, AND MATHEMATICIANS IN THE UNITED STATES AND AROUND THE WORLD

Background and Summary of the Legislation

Through H.Res. 1180, the House of Representatives recognizes the important contributions of women to science, technology, engineering, mathematics, and the health of many industries that have created new jobs, boosted economic growth, and improved the Nation's competitiveness and standard of living, recognizes the need to increase the number of women participating in science, technology, engineering, and mathematics, supports the role of women in science, technology, engineering, and mathematics, and encourages the people of the United States to give appropriate recognition to women scientists, technologists, engineers, and mathematicians who have made important contributions to our everyday lives.

While women have been vitally important to the fields of science, technology, engineering, and mathematics and have transformed the world and enhanced and improved the quality of life around the globe, a disproportionately low number of female students are pursuing careers in science, technology, engineering, and mathematics, and it is crucial that we focus attention on increasing the participation of women. Our schools must continue to cultivate female scientists, technologists, engineers, and mathematicians from every background and neighborhood in our society to create the innovations of tomorrow that will keep our nation strong. There is a need to encourage industry, government, and academia to reach and educate millions of children on the important contributions women have made to science, technology, engineering, and mathematics. It is important to emphasize the extensive variety of careers available in the world of science, technology, engineering, and mathematics and to honor the tremendous women that have contributed and will contribute to the advancement of knowledge in these disciplines.

Legislative History

Representative David Reichert and three co-sponsors introduced H.Res. 1180 on May 7, 2008, which was referred to the House Committee on Science and Technology. On June 4, 2008, the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by voice vote under suspension of the rules.

3.32—H.RES. 1312, COMMEMORATING THE 25TH ANNIVERSARY OF THE SPACE FOUNDATION

Background and Summary of the Legislation

Through H.Res. 1312, the House of Representatives recognizes the contributions made by the Space Foundation and commemorates the Space Foundation's 25 years of excellence and support to the Nation.

On March 21, 1983, the United States Space Foundation was founded by a small group of pioneering individuals in Colorado Springs, Colorado. The Space Foundation has become the leading nonprofit organization advancing the exploration, development, and use of space and space education for the benefit of all humankind. The Space Foundation embraces all aspects of space including commercial, civil, and national security. The Space Foundation has contributed to space education programs in all 50 States and also in Europe and Asia. The Space Foundation is regarded internationally as a leading space advocacy organization, and is a member of the United States Delegation to the United Nations Committee on the Peaceful Uses of Outer Space. The Space Foundation hosts the National Space Symposium and Strategic Space and Defense, two of the top conferences for space professionals.

Legislative History

Representative Doug Lamborn and three co-sponsors introduced H.Res. 1312, which was referred to the House Committee on Science and Technology on June 26, 2008. On July 9, 2008 the bill

was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by unanimous consent under suspension of the rules.

3.33—H.RES. 1313, CELEBRATING THE 25TH ANNIVERSARY OF THE FIRST AMERICAN WOMAN IN SPACE, DR. SALLY K. RIDE, AND HONORING HER CONTRIBUTIONS TO THE SPACE PROGRAM AND TO SCIENCE EDUCATION

Background and Summary of the Legislation

Through H.Res. 1313, the House of Representatives celebrates the 25th anniversary of Dr. Sally K. Ride as the first American woman in space and extends its appreciation and gratitude for Dr. Ride's excellence in service to the Nation as an astronaut, educator, and advocate for the next generation of women scientists and engineers.

Sally K. Ride of Los Angeles, California, a physicist by training and an accomplished athlete, was selected as a National Aeronautics and Space Administration (NASA) astronaut candidate in 1978, as part of the eighth class of NASA astronauts and one of only six women in the class. June 18, 1983, Dr. Ride was lofted into space aboard the Space Shuttle Challenger as part of the STS-7 crew, making her the first American woman in space. October 5, 1984, Dr. Ride made her second space flight as a mission specialist on STS 41-G, a mission that demonstrated the ability to refuel satellites in orbit and launched NASA's Earth Radiation Budget Satellite, which spent over 20 years providing valuable scientific data on the Earth's absorption and re-radiation of solar energy. When training for Dr. Ride's third space flight assignment ceased after the tragic loss of the Space Shuttle *Challenger* and her crew. In 1986, Dr. Ride was called to serve on the Presidential Commission on the Space Shuttle *Challenger* Accident.

As an educator, author of children's books, and advocate for the next generation of women in science, mathematics, and technology, Dr. Ride's work has contributed to the wellbeing of our youth. Dr. Ride has worked tirelessly and passionately to encourage young women to follow the sciences, mathematics, and technology by promoting science festivals, camps, and other opportunities through which young women can acquire hands-on learning about science.

Legislative History

On June 26, 2008 Representative Nick Lampson and three co-sponsors introduced H.Res. 1312 which was referred to the House Committee on Science and Technology. On July 9, 2008 the bill was discharged from the House Committee on Science and considered under suspension of the rules. On July 10, 2008, the House of Representatives agreed to the resolution by a voice vote.

3.34—H.RES. 1315, COMMEMORATING THE 50TH ANNIVERSARY OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Background and Summary of the Legislation

Through H.Res. 1315, the House of Representatives honors the men and women of the National Aeronautics and Space Administration on the occasion of its 50th Anniversary,

acknowledges the value of NASA's discoveries and accomplishments, and pledges to maintain America's position as the world leader in aeronautics and space exploration and technology.

The National Aeronautics and Space Administration was established on July 29, 1958. On May 5, 1961, NASA successfully launched America's first manned spacecraft, Freedom 7, piloted by Alan B. Shepard, Jr. In July of 1969 President John Kennedy's vision of landing a man on the moon and returning him safely to Earth was realized with the Apollo 11 mission, commanded by Neil A. Armstrong, Lunar Module Pilot Edwin 'Buzz' Aldrin, Jr., and Command Module pilot Michael Collins. On April 12, 1981, NASA began a new era of human space flight and exploration with the launch of the first Space Shuttle *Columbia*, commanded by John W. Young and piloted by Robert L. 'Bob' Crippen.

NASA has also greatly expanded our knowledge and understanding of our planet and solar system through various unmanned vehicles utilized on numerous missions, NASA space probes have landed on or flown by eight of the planets in our solar system.

The work done by NASA has expanded the scope of human knowledge, created new technologies, and inspired young men and women to enter scientific and engineering careers. NASA now serves as a model for international cooperation and American leadership through the International Space Station and other scientific endeavors. Thanks to NASA and the far-reaching gaze of the Hubble Space Telescope, we have seen further into our universe than ever before. The aeronautics research by NASA has led to great discoveries and advances in aircraft design and aviation.

Legislative History

Representative McCaul and 27 co-sponsors introduced H.Res. 1315 on June 26, 2008 and the resolution was referred to the House Committee on Science and Technology. On July 9, 2008 the bill was discharged from the House Committee on Science and considered under suspension of the rules. On July 10, 2008, the House of Representatives agreed to the resolution by a voice vote.

3.35—H.RES. 1390, EXPRESSING SUPPORT FOR THE DESIGNATION OF A 4-H NATIONAL YOUTH SCIENCE DAY

Background and Summary of the Legislation

Through H.Res. 1390, the House of Representatives expresses support for the designation of a 4-H National Youth Science Day, requests that the President issue a proclamation calling upon the people of the United States to observe 4-H National Youth Science Day, encourages the people of the United States to observe the day with appropriate ceremonies and activities, and encourages young

people of all ages and backgrounds to pursue science studies and enter into science careers.

Despite the need for science education, especially outside the classroom, being crucial to our country's ability to remain globally competitive, barely 18 percent of 12th grade students perform at or above the proficient level in science. Today only 32.4 percent of undergraduates in the United States are leaving college with a Bachelor's degree in science or engineering, compared to 63.3 percent in Japan, 62.1 percent in Germany, and 56.2 percent in China. Current scientists and engineers are retiring in record numbers, creating a potentially large void of skilled workers. American businesses will have difficulty staffing for our science- and technology-driven global economy unless they have a workforce that has been trained in scientific fields.

4-H and other out-of-school programs that focus on science, engineering and technology are an important part of educating and developing leaders who are well-trained and technically competent. 4-H is preparing America's future workforce by developing their passion for science, engineering, and technology at an early age. 4-H's educational programs have an unparalleled reach of more than 6,000,000 youth in all 50 States. 4-H, in partnership with more than 106 land-grant universities, shapes programs in the sciences that are important to today's workforce and critical for managing the world's resources for years to come. Youth, parents, teachers, schools, and youth organizations have the ability to participate in fun, accessible, science-related activities that encourage youth exploration and experimentation at an early age. This makes October 8, 2008 an appropriate day to designate as 4-H National Youth Science Day.

Legislative History

Representative Cardoza and nine co-sponsors introduced H.Res. 1390, which was referred to the House Committee on Science and Technology on July 30, 2008. On September 22, 2008 the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by unanimous consent under suspension of the rules.

3.36—H.RES. 1466, HONORING DR. GUION S. "GUY" BLUFORD, JR., AND THE 25TH ANNIVERSARY OF HIS HISTORIC FLIGHT AS THE FIRST AFRICAN-AMERICAN IN SPACE

Background and Summary of the Legislation

Through H.Res. 1466, the House of Representatives salutes the 25th anniversary of the pioneering accomplishments of Dr. Guion 'Guy' S. Bluford, Jr. as the first African-American in space and extends its gratitude and deep appreciation for Dr. Bluford's dedication, commitment, and excellence as an astronaut and a leader in support of the Nation's space program.

Born in West Philadelphia, Pennsylvania, Dr. Guion S. 'Guy' Bluford, Jr., was trained as an aerospace engineer and an Air Force pilot, conducted several combat missions, logged over 5,000 hours on numerous aircraft, conducted scientific research on com-

putational fluid dynamics, and became a National Aeronautics and Space Administration (NASA) astronaut in 1979. In the early morning hours of August 30, 1983, Dr. Bluford became the first African-American to enter outer space as a crew member of the STS-8 Space Shuttle mission. Dr. Bluford's pioneering STS-8 flight was the first mission to both launch and land at night. This mission successfully deployed a satellite, tested operations of the Shuttle's robotic arm, and released Getaway Special canisters to support science experiments.

On October 30, 1985, Dr. Bluford launched again with the crew of STS 61-A, the first Shuttle crew to include eight members, to conduct the United States-German cooperative D-1 Spacelab mission that was dedicated to advancing our understanding of the human vestibular and orientation systems and to conducting microgravity research in materials science, life sciences, and communication and navigation. Dr. Bluford went on to successfully complete two additional Shuttle missions with the Space Shuttle Discovery's launch of the STS-39 on April 28, 1991, and the STS-53 on December 2, 1992.

Among his other technical assignments, Dr. Bluford worked on Space Shuttle systems, the Shuttle robotic arm, payload safety and flight software verification in the Shuttle Avionics Integration Laboratory and the Flight Systems Laboratory, and on Spacelab systems and experiments. In remarking on his pioneering role as the first African-American in space, Dr. Bluford recounted, 'I wanted to set the standard, do the best job possible so that other people would be comfortable with African-Americans in space and African-Americans would be proud of being participants in the space program . . . and encourage others to do the same.' In 1993, Dr. Bluford left NASA and retired as a Colonel in the Air Force to continue his distinguished service to the United States space program through leadership positions in private industry and space-related organizations.

Legislative History

Representative Donna Edwards introduced H.Res. 1466 which was referred to the House Committee on Science and Technology on September 21, 2008. On September 22, 2008 the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by unanimous consent under suspension of the rules.

3.37—H.RES. 1471, HONORING THE 50TH ANNIVERSARY OF THE SUCCESSFUL DEMONSTRATION OF THE FIRST INTEGRATED CIRCUIT AND ITS IMPACT ON THE ELECTRONICS INDUSTRY

Background and Summary of the Legislation

The House of Representatives, through H.Res. 1471, recognizes and honors the research and development efforts of Jack Kilby and his contemporaries, who by inventing and perfecting the integrated circuit brought us modern electronics and changed the world and recognizes the importance of continued advancements in electronics to the well-being of America.

In May 1958 Jack St. Clair Kilby joined Texas Instruments because it was the only company that would permit him to work full-time on miniaturization of electronics. Just four months later on September 12, 1958, Jack Kilby demonstrated the first integrated circuit by combining a transistor, several resistors, and a capacitor on a half inch piece of germanium in an attempt to reduce transistor costs. Jack Kilby spent his career at Texas Instruments, a productive engineering career that resulted in over 60 patents and seminal inventions, including the electronic calculator. Jack Kilby received the National Medal of Science in 1969 and the National Medal of Technology in 1990, and shared the Nobel Prize in Physics in 2000, for his invention of and contributions to the development of the integrated circuit. During Kilby's lifetime integrated circuits provided a million fold decrease in the costs of electronics. Kilby's achievement revolutionized electronics and permitted it to grow to over \$1,500,000,000,000 in annual sales worldwide.

The integrated circuit revolutionized computing and made possible getting a man to the Moon and modern space exploration and led to a revolution in communications, transportation, and medical industries. The future will inevitably bring equally far-reaching integrated circuit-based advances in many fields.

Legislative History

Representative Ralph Hall introduced H.Res. 1312, which was referred to the House Committee on Science and Technology on September 22, 2008. On that same day, the bill was discharged from the House Committee on Science and the House of Representatives agreed to the resolution by unanimous consent under suspension of the rules.

CHAPTER IV—Oversight, Investigations and Other Activities of the Committee on Science and Technology, Including Selected Subcommittee Legislative Activities

4.1—COMMITTEE ON SCIENCE AND TECHNOLOGY

4.1(a)—The State of Climate Change Science 2007: The Findings of the Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC), Working Group I Report

February 8, 2007

Hearing Volume No. 110–2

Background

On February 8, 2007, the Committee on Science and Technology held a hearing entitled “*The State of Climate Change Science 2007: the Findings of the Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC), Working Group I Report.*” The report presents a comprehensive appraisal of the current state of scientific knowledge of climate change.

The Committee received testimony from: (1) the Honorable Nancy Pelosi (D–CA), Speaker of the House for the United States House of Representatives; (2) Dr. Susan Solomon of the National Oceanic and Atmospheric Administration (NOAA) and Co-Chair of Working Group I of the IPCC; (3) Dr. Kevin Trenberth of the National Center for Atmospheric Research (NCAR) and coordinating lead author for Chapter 3 of the Working Group I Report of the 2007 IPCC assessment; (4) Dr. Richard Alley, Professor in the Department of Geosciences at Pennsylvania State University and the lead author for Chapter 4 of the Working Group I Report of the 2007 IPCC assessment; and (5) Dr. Gerald Meehl of the National Center for Atmospheric Research (NCAR) and coordinating lead author for Chapter 10 of the Working Group I Report of the 2007 IPCC assessment.

Summary of Hearing

Chairman Gordon (D–TN) began the hearing by emphasizing that the IPCC report provides overwhelming evidence that global warming is real and that human activity is driving this change. Armed with this evidence, policy-makers need to reduce emissions, adapt to coming changes, and mitigate the negative effects of a changing climate. Gordon identified the need for technologies to reduce emissions and improve energy efficiency. He also stressed that the Nation needs continued scientific research and better, more re-

fined regional assessments to understand the climatic vulnerabilities of communities, ecosystems, and our economy.

Ranking Member Hall (R-TX) recognized that climate change is an important issue, yet he is skeptical that the Nation needs mandatory regulation of greenhouse gases. His skepticism stems from the concern that a rise in natural gas prices will result in the Nation's factories closing, layoffs, and an unknown, but potentially significant, cost to the economy. These concerns are augmented by whether other countries are willing to reduce their own emissions.

Before the first panel, Congressman Sensenbrenner (R-WI) raised a parliamentary inquiry asking whether or not the first panel witness, House Speaker Nancy Pelosi, would be questioned under the five-minute rule. Chairman Gordon sought to excuse Speaker Pelosi after her opening remarks, and asked for unanimous consent. Mr. Sensenbrenner objected.

Speaker Pelosi testified that successful mitigation of global warming cannot occur without mandatory greenhouse gas reduction. This action will drive both energy technology development and job growth. In addition to restrictions on greenhouse gas emissions, Pelosi also recognized the Nation needs to address land use policies and collaborate with other countries, like India and China, on these issues. Finally Pelosi announced that Committee Chairs are developing legislation for an energy independence and global warming package and that the House has created a Select Committee on Energy Independence and Global Warming.

During the Second panel, the Committee heard from four witnesses who were involved in the preparation of the Working Group I Report. The witnesses presented the findings of the report and discussed the relationship between the current findings and those of past IPCC reports on the state of climate change science.

Dr. Solomon, Co-Chair of Working Group I, discussed the history of greenhouse gas levels, which have increased remarkably from 1750 causing an increase to global average temperature. She explained that with continued emissions we can expect more heavy rain, more droughts, more heat waves, and more sea level rise. She noted the report's contents and conclusions were reached by consensus with hundreds of scientists including many of the next generation of climatic researchers.

Dr. Trenberth testified on surface and atmospheric climate change. He asserted that warming is unequivocal, evidenced, for example, by a rise in global surface temperatures, subsurface sea temperatures, extreme weather events and sea level, and a decrease in glacial cover, arctic sea ice and northern hemisphere snow extent.

Dr. Alley testified on changes in snow, ice, and frozen ground in response to climate change. With widespread melting, he explained that the dynamics of these ice masses is uncertain. New factors are being explored, for example the effect of liquid water underlying a glacier quickening its pace outward.

Dr. Meehl testified on the models that were used to form the report's predictions. These large, open access models simulated different emission and stabilization scenarios.

The Members asked about the melting rate of the large ice masses, including the polar ice sheets. The witnesses testified that

by the end of the century there will be an ice free arctic, however the specifics of the melt are hard to model given so much uncertainty with large ice flow dynamics. Members also asked about changes in CO₂ levels. The amount of CO₂ has increased from a recent historical average of 270 parts per million to 380 parts per million. The witnesses explained the isotopic composition of atmospheric carbon is evidence for the anthropomorphic causes of this change.

***4.1(b)—National Imperatives for Earth and Climate
Science Research and Applications Investments
Over the Next Decade***

February 13, 2007

Hearing Volume No. 110-3

Background

On Tuesday, February 13, 2007, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to examine the findings and recommendations of the National Academies report, *“Earth Science and Applications from Space: National Imperatives for the Next Decade and Beyond,”* also known as the Decadal Survey.

The Committee heard from: (1) Dr. Richard Anthes, President, University Corporation for Atmospheric Research (UCAR); (2) Dr. Berrien Moore, Professor and Director of the Institute for the Study of Earth, Oceans, and Space, University of New Hampshire; (3) the Honorable James Geringer, Director of Policy, Environmental Systems Research Institute in Wyoming and former Governor of Wyoming.

Summary of Hearing

Chairman Gordon opened the hearing by referring to the conclusions of the Intergovernmental Panel on Climate Change. He stressed the need for a robust system of environmental satellites to ensure sufficient and correct climate change data. Ranking Member Hall agreed with Mr. Gordon about the importance of federal planning and funding to ensure the success of future Earth-observing missions and stressed the value in monitoring and measuring drought conditions. He expressed his support for the Decadal Survey, though he was concerned about implementing recommendations in light of budget constraints.

Dr. Anthes argued that the capability of the Earth observation program will dramatically diminish over the next five to ten years. He explained that a lack of funding for the program will result in a decline in the quality of Earth Science research, which will in turn decrease the accuracy of weather forecasts and warnings. He described the UCAR recommended plan to undertake 17 new NASA and NOAA missions to address climate change science.

Dr. Moore explained that the NASA Earth Science budget has declined by a third since the year 2000. He suggested that NASA invest \$10 million per year per mission in order to begin to implement the Decadal Survey. He also listed some of the potential ben-

efits from increasing funding, such as monitoring faults and crustal movements, climate predictions, and urban pollution management.

Mr. Geringer addressed the drought situation in the western states, and pointed out that it is more economical to invest in satellites and observation information to lessen the effects of a drought than to spend even more federal dollars in drought assistance after the fact. He predicted that the decline in our Earth observation capability will lead to a decline in our competitiveness and harm several aspects of the Nation's agriculture.

During the discussion period, Chairman Gordon received further explanation of the witnesses' endorsements of the proposed 17 replacement missions. Mr. Geringer offered his suggestions for funding priorities in addressing the Decadal Survey. The witnesses elaborated on the importance of comprehensive Earth observing data to assessing and treat both regional and global climate challenges as well as ethanol and agricultural production. They explained details of the Decadal Survey recommendations and the use of NPOESS climate study instruments. The rest of the discussion focused on recent weather and natural disaster activity, gaps in data records, remote sensing, and America's relationship to the international observation technology community.

***4.1(c)—The Administration's Fiscal Year 2008
Research and Development Budget Proposal***

February 14, 2007

Hearing Volume No. 110-5

Background

On Wednesday, February 14, 2007, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to consider the Administration's proposal for FY 2008 research and development (R&D) funding. The only witness was Dr. John H. Marburger III, Director of the Office of Science and Technology Policy and Co-Chair of the President's Committee of Advisors on Science and Technology.

Summary of Hearing

Chairman Gordon expressed disappointment at the proposed decrease in funding for K-12 education programs at the National Science Foundation (NSF) and suggested that the Administration's science and math education priorities were misplaced. He also expressed concern about the proposed cuts to the Manufacturing Extension Partnership and Advanced Technology Program at NIST and to the Industrial Technologies Program at DOE. He did praise the increase for DOE's Office of Science.

Ranking Member Hall praised the Administration's budget proposal overall, but suggested that the proposed increase for NASA may not be sufficient to achieve the goal of a 2014 launch date for the new Crew Exploration Vehicle.

Dr. Marburger presented highlights of the Administration's FY 2008 R&D budget proposal, including the overall increases provided for NSF, DOE's Office of Science and NIST under the American Competitiveness Initiative. During the question and answer

portion of the hearing, Dr. Marburger answered Committee questions about: K–12 science and math education priorities; funding for Earth sciences and aeronautics research at NASA; funding for NASA’s exploration mission; status of fusion research and facilities at DOE; health risks research under the nanotechnology initiative; funding for renewable energy research, in particular biofuels research at DOE; and a number of other budget and policy issues across the R&D agencies.

**4.1(d)—Science and Technology Leadership in a 21st
Century Global Economy**

March 13, 2007

Hearing Volume No. 110–10

Background

On Tuesday, March 13, 2007, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to receive testimony on the critical importance of science and technology to our nation’s prosperity. The focus was on the provisions of the National Academy of Sciences report entitled *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*. Witnesses had been asked to address the reasoning behind the education and research recommendations enunciated in that report.

Six witnesses testified: (1) Mr. Norman R. Augustine, Retired Chairman and CEO, Lockheed Martin Corporation; (2) Mr. Harold McGraw, III, Chairman, President and CEO, McGraw-Hill Companies; (3) Dr. Robert Dynes, President, University of California; (4) Dr. Craig Barrett, Chairman of the Board, Intel Group; (5) Dr. Neal Lane, Malcolm Gills University Professor, Rice University, Senior Fellow, James Baker III Institute for Public Policy; (6) Ms. Deborah Wince-Smith, President, Council on Competitiveness.

Summary of Hearing

During his opening statement, Chairman Gordon emphasized the importance of ensuring that our children are among the highest achievers in the science and technology fields. He plans to do this through legislation like the *Science and Math Scholarship Act* and *Sowing the Seeds through Science and Engineering Research Act*. Ranking Member Hall urged the Congress not only to improve education but promote competitiveness as well as increase federal R&D funding, while simultaneously stimulating private sector R&D.

In his testimony, Mr. Augustine discussed the “death of distance” principle, meaning that many transactions in the past that required people to be in close proximity no longer do. He suggested that in order to stay competitive we need to continue to be the world’s best innovators as well as the first to market. Mr. McGraw mentioned the U.S.’s role as an economic leader, but also mentioned that his lead could slip. Federal funding for R&D would play a critical role in maintaining our position in the world. Dr. Dynes cited the Science and Math initiative as one of his highest priorities as the president of the University of California. He plans to

strengthen these areas by recruiting potential math and science majors as teachers, providing these students with innovative curricula that rely on the expertise of faculty in science, math, and education and offering incentives to attract and retain these students as teachers. The UC Science and Math initiative has attracted support from both the private and public sectors.

Dr. Barrett discussed the merits of Bob Noyce for whom the Noyce Scholarship Program was named. He also discussed that while there are wonderful research universities in the United States, more needs to be done, citing H.R. 362 and H.R. 363 as steps in the right direction. Dr. Lane urged that investments need to be made in science and technology for the well-being of future generations. He offered his opinion of current legislation intended to improve science education, suggesting increased funding for NOAA. Ms. Wince-Smith focused on the importance of effective legislation to strengthen our entrepreneurial economy.

During the discussion period, Mr. Augustine addressed the importance of engaging children in the sciences at an early age. He also endorsed the view of engaging girls in science education at a young age. Mr. McGraw stressed the importance to enhancing not only science and mathematics education, but reading as well, suggesting it is the cornerstone of an effective education. He also argued that the U.S. education system was and continues to essentially be strong and effective, but it needs to adapt the global economy. Mr. Augustine commented on the lack of emphasis on the life sciences at the National Academies, claiming that he felt they had been addressed adequately by the government in recent years, and the focus must shift to physical science. When discussing competitiveness, Dr. Barrett urged that we need to compete not merely on a quantitative level, but in terms of quality as well.

4.1(e)—NASA's Fiscal Year 2008 Budget Request

March 15, 2007

Hearing Volume No. 110-12

Background

On Tuesday, May 15, 2007, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to discuss the National Aeronautics and Space Administration's (NASA) Fiscal Year 2008 Budget Request and NASA's proposed Fiscal Year 2007 Operating Plan.

The Committee heard testimony from Dr. Michael D. Griffin, Administrator of the National Aeronautics and Space Administration.

Summary of Hearing

Chairman Gordon opened by listing a number of problems with the proposed 2008 NASA budget, suggesting the agency is headed for a financial train wreck if necessary changes are not made. He noted the White House's disengagement in promoting space exploration as an additional budgetary concern. Ranking Member Hall called for NASA to establish a clear mission and encouraged Dr. Griffin to communicate with other agencies and the Bush Administration to help develop an appropriate budget. Rep. Udall called for

an emphasis on science and engineering education, R&D, and human space flight and exploration in the 2008 budget, but judged that existing funds are greatly insufficient for accomplishing future recommended missions. Rep. Calvert suggested that a bipartisan approach could best educate peer agencies and encourage a sufficient NASA budget.

Dr. Griffin asserted that the two critical components to a balanced and appropriate budget are a clear strategic vision and generous allocation. During the discussion portion of the hearing, the Members and Dr. Griffin addressed NASA budget and management shortfalls. They discussed the *Columbia* accident and its relationship to budget and schedule pressures, concluding that crew safety should be the top priority for future projects. In addition, the Members asked Dr. Griffin for updates on the progress of several NASA projects, including the SOFIA mission and the CEV program, and explored the present allocations and future goals for workforce education and international relations for American space ventures.

***4.1(f)—The State of Climate Change Science 2007:
The Findings of the Fourth Assessment Report by
the Intergovernmental Panel on Climate Change
(IPCC), Working Group II: Climate Change Im-
pacts, Adaptation and Vulnerability***

April 17, 2007

Hearing Volume No. 110–20

Background

On April 17, 2007, the Committee on Science and Technology held a hearing on the second section of the 2007 Fourth Assessment Report, *Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability*, prepared by Working Group II of the Intergovernmental Panel on Climate Change (IPCC). The summary document highlights the key findings of the comprehensive appraisal of the current state of scientific knowledge on the impacts of climate change on natural and human systems around the world.

The Committee heard from the following six witnesses: (1) Dr. Virginia Burkett, U.S. Geological Society (USGS) Global Change Science Coordinator and lead author for Chapter 6, Coastal Systems and Low Lying Areas, of the Working Group II Report; (2) Dr. William E. Easterling, Director, Pennsylvania State University Institutes of the Environment and coordinating lead author for Chapter 5, Food Fibre and Forest Products; (3) Dr. Roger Pulwarty, Research Associate, National Oceanic and Atmospheric Administration's (NOAA) Climate Diagnostics Center and the lead author for Chapter 17, Assessment of Adaptation Practices, Options, Constraints and Capacity; (4) Dr. Cynthia Rosenzweig, Senior Research Scientist at NASA Goddard Institute for Space Studies and the coordinating lead author for Chapter 1, Assessment of Observed Changes and Responses in Natural and Managed Systems; (5) Dr. Stephen H. Schneider, Co-Director, Center for Environmental Science and Policy (CESP) and the Interdisciplinary Program in Environment and Resources (IPER) at Stanford University and the coordinating lead author for Chapter 19, Assessing Key

Vulnerabilities and the Risk from Climate Change; and (6) Dr. Shardul Agrawala is a Visiting Research Scholar in the Program in Science, Technology and Environmental Policy at Princeton University and coordinating lead author for Chapter 17, Assessment of Adaptation Practices, Options, Constraints, and Capacity.

Summary of Hearing

Chairman Gordon (D-TN) opened the hearing by describing the near-term positive and negative impacts of global warming. Global warming will put some areas at increased risk for floods, drought, avalanches and fires. Other areas could benefit from lower heating costs, a longer growing season and fewer deaths due to cold exposure. This second report addressed these impacts, but emphasized that the negatives will outweigh the positives. Mr. Gordon explained that global warming will have severe impacts on future generations, and therefore adaptation is needed.

Ranking Member Hall (R-TX) recognized that climate change is important, but not at the expense of energy independence and affordability. He is skeptical of any legislation that mandates a carbon regulatory scheme. He noted the government is adapting to climate change by taking the lead in drought warning and preparedness. According to Rep. Hall, what is not needed is a “war” on fossil fuels.

During her testimony, Dr. Rosenzweig explained that the observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate change, particularly temperature increases. For example, scientists have observed glacial lake expansion, ground instability in permafrost regions, and changes in some Arctic and Antarctic ecosystems, including those in sea-ice biomes, and also predators high in the food chain. She explained that much more evidence has accumulated over the past five years to indicate that changes in many physical and biological systems are linked to anthropogenic warming.

Dr. Easterling discussed the impact of climate change on food production. Regional trends point to major crop yield loss in the low latitudes, where a majority of the poorest people in the world live, and temporary crop yield gains in the mid- to high latitudes. He explained that moderate warming could be adaptively dealt with, but increased variability in weather patterns could be very costly.

Dr. Burkett discussed the impact of climate change on coastal systems. Burkett noted that while the nature of the risk is different in different coastal areas, the mega deltas of the world are at most risk, due to their low-lying nature and development rate.

Dr. Agrawala explained that both adaptation and mitigation are needed to address climate change. Mitigation—through the reduction in sources or enhancement of sinks of greenhouse gases—reduces all impacts of climate change. Adaptation—through adjustments in human and natural systems to actual or expected climatic changes—can be selective. It can reduce negative impacts, and take advantage of the positive.

Dr. Pulwarty testified that the insurance industry is already adapting to problems of climate change. He added that adapting to

tightening water availability and quality will be important, especially in the West.

Dr. Schneider emphasized that climate has done what a lot of long established theory has predicted. The IPCC is a reflection of the scientific thinking on climate change, and separates the speculative from the established points. However, while the IPCC provides criteria, metrics, and magnitudes of climate change effects, it cannot put a final value to them.

***4.1(g)—The State of Climate Change Science 2007:
The Findings of the Fourth Assessment Report by
the Intergovernmental Panel on Climate Change
(IPCC), Working Group III: Mitigation of Climate
Change***

May 16, 2007

Hearing Volume No. 110–30

Background

On Wednesday, May 16, 2007, the Committee on Science and Technology held a hearing on the third section of the 2007 Fourth Assessment Report, *Climate Change 2007: Mitigation of Climate Change*, prepared by Working Group III of the Intergovernmental Panel on Climate Change (IPCC). The summary document highlighted the key findings of the comprehensive appraisal of the current state of scientific knowledge on strategies to mitigate climate change.

The Committee heard from the following four witnesses: (1) Dr. Mark Levine, Division Director of the Environmental Energy Technologies Division at Lawrence Berkeley National Laboratory (LBNL) and coordinating lead author for Chapter 6, Specific Mitigation Options in the Short- and Medium-Term—Residential/Commercial Sector (Including Services) of the Working Group III Report; (2) Dr. William A. Pizer, Senior Economist at the National Commission on Energy Policy and lead author for Chapter 11, Mitigation from a Cross-Sectoral Perspective; (3) Mr. Steven Plotkin, Transportation Energy and Environmental Systems Analyst at the Center for Transportation Research at the Argonne National Laboratory and lead author for Chapter 5, Specific Mitigation Options in the Short- and Medium-Term—Transport and Infrastructure; and (4) Dr. Roger Pielke, Jr., Director of the Center for Science and Technology Policy Research and Professor in the Environmental Studies Program at the University of Colorado.

Summary of Hearing

Chairman Gordon (D-TN) opened by noting that the IPCC report tells us that avoiding more than a four degree increase of global mean temperatures means having to mitigate our carbon dioxide emissions. The IPCC Work Group III Report is a consensus document, one that all nations and scientists have agreed to. He noted the costs of both mitigation and that of a warming Earth and stated that the U.S. must lead the world in this effort. Ranking Member Hall emphasized that the most sensible policy assures affordable, reliable, and clean energy sources. He stated that the IPCC

Report should have couched their conclusions in more concrete advice.

Dr. Levine commended the IPCC process for its rigor and lack of bias. The estimates for energy savings of these technologies are better known and the projections in the study are far better than previous reports. He testified that building better buildings should have better net economic benefits, but these technologies are harder for the developing world to build with. Dr. Pizer provided estimates of how mitigation costs would affect national GDP, adding that the suggested figures have a wide margin of uncertainty. He noted that technology is expensive; thus, the U.S. needs to create broad flexible policies and make responsive choices within those frameworks.

Mr. Plotkin testified on the mitigation efforts involving the transport sector, as transportation creates a quarter of green house gas-related energy. Although technology has improved, it is often used to increase performance and not energy efficiency. However, he explained, technological improvements in design, such as increases in aerodynamics and engine technology could reduce energy use significantly. He testified that efficiency standards with fuel taxes successfully decreased fuel consumption.

Dr. Pielke began with three points: (1) we have the opportunity to talk and decide what kind of future we want; (2) mitigation outweighs the costs of global warming; (3) Working Group III realizes that global warming is one area of many of the problems in the world. He emphasized that focusing on carbon dioxide cannot substitute for a broader effort of creating a better future and developing responsibly. In addition, he argued that research on climate should be more responsive to policy-makers.

Several Members worried about the effects of mitigation on the American taxpayer and feared a lack of international cooperation, i.e., with China. Dr. Levine emphasized that local environmental effects in China have created a demand for increased efficiency from their economy. Lately, Dr. Levine stated, they have been successful in reducing their energy to GDP ratio. Dr. Pizer stated that the U.S. must show it is serious about mitigation in order to convince the international community to participate. Members expressed concern about oil taxes, and Dr. Pielke suggested that increasing the cost of fossil fuels was an effective way to discourage their use.

Another large discussion point was how to increase the energy efficiency of daily life technology. Dr. Levine stressed the importance of efficient building in housing, noting that designers are not paid to be efficient; highlighting the need for standards. He also commended the Energy Star program but explained that more readily available consumer information is always needed.

**4.1(h)—The Role of Technology in Reducing Illegal
Filesharing: A University Perspective**

June 5, 2007

Hearing Volume No. 110-34

Background

On Tuesday, June 5, 2007, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to discuss the experiences of universities that use technology to reduce copyright-infringing filesharing on their campus networks. University representatives and a leading technologist discussed the potential and limitations of these technologies, techniques for realistically evaluating these technologies, and the universities' experiences in using them.

The witnesses were: (1) Dr. Charles Wight, Associate Vice President for Academic Affairs and Undergraduate Studies at the University of Utah; (2) Dr. Adrian Sannier, Vice President and University Technology Officer at Arizona State University, on leave from Iowa State University; (3) Mr. Vance Ikoyze, President and CEO of Audible Magic Corporation; (4) Ms. Cheryl Asper Elzy, Dean of University Libraries at Illinois State University (ISU) and a member of the management team of ISU's Digital Citizen Project; and (5) Dr. Greg Jackson, Vice President and Chief Information Officer at the University of Chicago.

Summary of Hearing

Illegal filesharing activities on university campuses can consume a significant amount of network resources and infringe on copyrights. Many college and university campuses have adopted technological measures to prevent or reduce illegal filesharing on their networks. The hearing covered several important issues, including: the successes and limitations of technological measures in reducing illegal filesharing; the effects of these technologies on network speed, reliability, privacy and legitimate use; and the vulnerability of these technologies to hackers and other means to circumvent the respective filters. Chairman Bart Gordon opened the hearing by noting that illegal filesharing interferes with the educational mission of colleges and universities by clogging campus networks and wasting resources. He pointed out that we rely on technology to combat spam and hackers, though these solutions are not perfect, and he stated that he believes technology will be the first line of defense against illegal filesharing. Ranking Member Ralph Hall noted that high-speed Internet access has made illegal filesharing easier than ever, but no single solution will stop the practice. He stated that technology will be part of a larger anti-piracy solution that will include legal alternatives and education.

Dr. Wight stated that protecting intellectual property is important to universities. Intellectual property protects faculty discoveries and materials, and fair-use policies enable learning and research. He testified that while technology cannot identify and eliminate all copyright-violating transmissions, the University of Utah approach is largely effective. He explained that the Univer-

sity of Utah monitors its networks for excessive usage and runs the Audible Magic network filter software in its residence halls. After implementing these approaches, the university substantially reduced the number of copyright violation notices it received, and saved \$1.2 million per year in Internet bandwidth charges and \$70,000 per year in personnel costs.

Dr. Sannier stated that Arizona State University adopted an acceptable use policy prohibiting illegal filesharing, and was an early adopter of the Recording Industry Association of America's best practices to prevent student exposure to lawsuits. Dr. Sannier recounted how Arizona State University adopted packet-shaping technology in 2000, but that by 2006, the amount of peer-to-peer illegal filesharing had outstripped the utility of that technology. At that point the university adopted the Audible Magic network filter, which Dr. Sannier described as one of the easiest technical adoptions the campus has ever undertaken. He concluded by noting that despite being pleased with this technological solution, he remained concerned that filesharing programs would evolve, sparking a technological arms race.

Mr. Ikezoye testified that Audible Magic's network filter system was introduced in 2003 and is currently used by over 70 colleges and universities. He explained that the network filters those files transferred over known public peer-to-peer filesharing applications that match copyrighted materials on a registered database. The technology has contributed to significant reductions in illegal filesharing, citing one example where a campus saw an 80 percent decrease in total network traffic within one month of adopting the system. Mr. Ikezoye noted that the technology is not an in-line device and therefore does not contribute to network slow-down, and that it is possible to configure the privacy settings of the system to keep violators anonymous. He concluded by noting that technology will not be the entire solution to the problem of illegal filesharing, but it is an essential tool.

Ms. Elzy described Illinois State University's Digital Citizenship Project. Begun in 2005, the project has worked with a variety of stakeholders to create a comprehensive solution to counter illegal filesharing, including education, network monitoring, and providing legal alternatives. She explained that the long-term goal of the project was to provide a comparative study of anti-illegal filesharing technologies and the legal alternatives to allow colleges and universities to make the best choices for their networks. Ms. Elzy noted that the available technologies were not yet at the level of effectiveness sought by the entertainment industry and Congress, but that a comparative study would allow institutions to make the best decisions possible.

Dr. Jackson also noted that intellectual property rights were vital to the university mission, but that access to materials was equally important. He stated that the University of Chicago viewed copyright infringement seriously, educating students and fining violators. He also noted that because files are often transported over servers divided into smaller pieces that do not contain identifiable content, many anti-infringement technologies are not viable on high-performance networks. He expressed his view that until legal alternatives were available and unrestrictive, students and con-

sumers would continue to make illegal choices. Dr. Jackson also stated his belief that education and behavioral change would be more effective tools than technology to combat illegal filesharing.

**4.1(i)—The Globalization of R&D and Innovation,
Part I**

June 12, 2007

Hearing Volume No. 110–39

Background

On Tuesday, June 12, 2007, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to consider the implications of offshoring R&D for U.S. workers and the economy. Technological innovation is the key to maintaining and improving American's standard of living, but science and engineering work—the fundamental building block of innovation—has become increasingly vulnerable to the practice of offshoring. This hearing explored the implications of this trend on the U.S. workforce, the U.S. science and engineering education pipeline, competitiveness, economic growth, and our innovation system.

The witnesses were: (1) Dr. Alan S. Blinder, Professor of economics at Princeton University and Director of Princeton's Center for Economic Policy Studies; (2) Dr. Ralph E. Gomory, President of the Alfred P. Sloan Foundation; (3) Dr. Martin N. Baily, Senior Fellow at the Peterson Institute for International Economics and Senior Adviser to McKinsey Global Institute; and (4) Dr. Thomas J. Dueterberg, President and CEO of the Manufacturers Alliance/MAPI.

Summary of Hearing

The hearing focused on the following issues: the scale and scope of the offshoring of science and engineering jobs, as well as R&D investments; the effects, both positive and negative, of this offshoring on the U.S. economy; and the policies used by foreign countries to attract R&D and science and engineering investment. Chairman Gordon stated that an increasing number of reports indicate U.S. jobs are being moved to foreign countries and cited a University of Texas study that over the last year, 60 percent of new major R&D facilities were located in Asia compared to nine percent in the United States. He was worried that the offshoring of jobs could, for the first time in America's history, lead to future generations of Americans with a lower quality of life than their parents. He stated that he recognized industry was responding to the intense demands of the global marketplace but he emphasized that the Committee's goal was to enact policies to make sure that the best available engineers, scientists, and students are found in the U.S. Ranking Member Ralph Hall thanked the Chairman for having the hearing to analyze the threats that globalization and offshoring place on the country and economy and stated that he believed much of the testimony would agree with the *Rising Above the Gathering Storm* report. Mr. Hall worried that if the U.S. is complacent and loses engineering and technological jobs, the country will have an uphill fight to maintain a prosperous economy.

Dr. Blinder emphasized that the basis for the high wages U.S. workers enjoy—education and access to technology and capital—are becoming more commonplace around the globe, and investment is following cheap labor. He stated that rapidly improving communications technology is a major force behind U.S. workforce offshoring, particularly for high-skilled jobs. Dr. Blinder noted that offshoring in the service-sector poses unique challenges because there are now more service-sector jobs than manufacturing, and service employees are not accustomed to competing with workers in developing countries for jobs. He stated that the policy agenda should focus on three policy areas: training for workers who have lost jobs to offshoring; increased educational focus in areas less vulnerable to offshoring; and innovation and technology development.

Dr. Baily stated that he had a more favorable view of globalization than Dr. Blinder, and that he believed the trend has made the U.S. more competitive and productive through better use of technology and capital. He pointed out that 80 percent of available world-wide capital flows into the U.S. and only 15 percent flows out. Dr. Baily stated his view that many of the problems associated with globalization are the result of the U.S.'s current exchange rate which places service industries at a disadvantage. However, he called upon the U.S. to better provide for and re-train workers displaced by offshoring. He also noted that the U.S. has benefited substantially from foreign-educated workers in science and technology sectors coming to work in this country. Dr. Baily advocated continued R&D investment in a broad range of areas and scholarships for American students studying in the science, technology, engineering, and math (STEM) fields.

Dr. Gomory stated his view that the interests of companies and countries have diverged and that this divergence had enormous implications for national competitiveness. He described the shift caused by globalization of scientific and technical industries from a U.S. dominated enterprise to one now shared by many other countries. Dr. Gomory drew a distinct difference between free trade and globalization: in free trade theory, the means of production are fixed, but since globalization has led to the movement of productivity capabilities, globalization is not free trade. He stated that the only way the home country can recover is to increase productivity. Thus, he testified that improving education and R&D opportunities would not be sufficient. Rather, the U.S. needs to undertake measures to make investments in production capabilities in this country more profitable. He suggested a revenue-neutral corporate tax that charges lower rates to companies with high value added per U.S. employee could be used to realign corporations' profit interests with those of their home country.

Mr. Duesterberg emphasized that the manufacturing industry has key insights into globalization since it has been competing with foreign competition for more than thirty years. This competition has led U.S. industry to make innovations in efficiency. He testified that even though the manufacturing industry is now relatively small in the U.S., it has increased its global manufacturing output from 22.9 percent to 23.8 percent between 1980 and 2003, and its high-tech output has increased from 25 percent in 1980 to 42.5 percent in 2005. Mr. Duesterberg stated that there was a positive cor-

relation between employment increases at foreign affiliates and at their domestic parent companies. He noted that offshoring jobs often allows U.S. companies to better compete in foreign markets. He informed the Committee that research and development is the least globalized activity for U.S. multinational corporations, representing 13.7 percent of foreign affiliate sales. He cautioned that there is not enough information on innovation to predict the effect of outsourcing on innovation. In studies done by the Alliance capital investment, university-industry linkages, and employment of scientists and engineers were crucial factors for promoting innovation. Mr. Duesterberg advocated for free trade agreements, the Federal Government's current monetary policy, deficit reduction, low taxes, and ways to address tort litigation. He also called for increased spending in the scientific and engineering fields to encourage students to obtain scientific or engineering degrees while creating a better career path for these students.

**4.1(j)—The Globalization of R&D and Innovation,
Part II: The University Response**

July 26, 2007

Hearing Volume No. 110–49

Background

On Thursday, July 26, 2007, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a second hearing to discuss the effects of globalization on the science, technology, engineering, and mathematics (STEM) fields. The Members and witnesses focused on the globalization of the American university system and STEM education.

The witnesses were: (1) Dr. David J. Skorton, President of Cornell University; (2) Dr. Gary Schuster, Provost and Vice President for Academic Affairs of the Georgia Institute of Technology; (3) Mr. Mark Wessel, Dean of the H. John Heinz III School of Public Policy and Management at Carnegie Mellon University; and (4) Dr. Philip Altbach, the Director of the Center for International Higher Education and the J. Donald Monan SJ Professor of Higher Education at Boston College.

Summary of Hearing

The hearing covered several important areas including: the motivations that drive universities to open branch campuses overseas; the influence these programs have on the offshoring of STEM jobs; how U.S. universities are preparing their students for long-term competition in the global economy; how these foreign campuses and programs affect the flow of advantages in the global economy; and how overseas educational programs affect the flow of foreign students to American universities. Chairman Gordon noted that due to pressures from globalization, a STEM education no longer guaranteed a lifetime of good employment. However, he also noted that universities play a vital role in helping the country remain economically competitive, thus he was eager to learn about the potential benefits and costs to U.S. competitiveness associated with the offshoring of American university programs. Ranking Member

Ralph Hall pointed to the wide range of models for how U.S. educational institutions were coping with globalization. He also stated that he was curious about how international experiences affected U.S. students, whether overseas campuses stimulated the American economy, and what effect higher education had on America's image abroad. Research and Science Education Subcommittee Chairman Brian Baird, later presiding, stated that he was interested to know how globalization, having already dramatically changed the corporate economy, would affect the American higher education system.

Dr. Skorton argued that higher education played a crucial role in American diplomacy and promoting American competitiveness. He noted that American students studying in foreign countries promote cross-cultural understanding and that attracting international students to the U.S. can fill demand for specialized talents. He also viewed attracting students to branch campuses as part of the process of recruiting and retaining the best minds in the STEM fields. He testified that the decision to develop overseas programs was governed by whether the arrangement would create tangible benefits with manageable risks and explained that universities factor foreign government attitudes and regulations regarding their presence and the availability of talent and resources to perform high-quality research into their decision. Dr. Skorton stated that maintaining the affordability of higher education for both international and domestic students would require a serious public commitment.

Dr. Schuster emphasized that universities choose their international programs and locations often to promote their own strategic advantage. He also noted that alumni from his own institution reported that international experience added value to their diplomas. He explained that any university engaging in international programs had faced visa challenges. In some cases these hurdles impacted their ability to attract the best minds, but dialogue between universities and immigration agencies were addressing some of these issues. Dr. Schuster also argued that American cultural values helped explain why domestic universities continued to attract so many students and that exporting these values through education was a net positive.

Mr. Wessel testified that American universities, facing increased competition domestically and internationally, were starting to consider globalization as a part of their overall institutional strategy. He stated that expansion overseas allowed universities to offer more services and provided an overall benefit to the U.S. economy, even though some jobs moved offshore as a result. He also argued that branch campuses abroad resulted in more international students coming to the U.S. and strengthened ties to academic communities overseas. Noting that many international students studied in the U.S. in order to get an American job, Mr. Wessel argued that it was in the economic interest of the U.S. to attract these students.

Dr. Altbach noted that American universities are currently the gold standard of higher education but that if they failed to globalize, foreign schools would be quick to take their place. He explained that branch campuses were the preferred connection

abroad, but that they did not always earn a profit. Dr. Altbach recounted that several Mexican universities were considering branch campuses in the U.S., but on the whole, foreign universities had always failed in the U.S. because American schools were considered the model by students.

***4.1(k)—Bridge Safety: Next Steps to Protect the
Nation's Critical Infrastructure***

September 19, 2007

Hearing Volume No. 110-53

Background

On Wednesday, September 19, 2007, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to examine research and development activities to improve the safety of the Nation's bridges in the wake of the August 2007 I-35 Minnesota bridge collapse. The hearing explored the current state of bridge-related research, including government and academic research into materials, design elements, and testing and inspection technologies, and also discussed future research priorities for bridge building and maintenance to avoid catastrophic failure.

The witnesses were: (1) Mr. Dennis Judycki, Associate Administrator for Research, Development, and Technology at the Federal Highway Administration (FHWA) of the U.S. Department of Transportation (U.S. DOT) and Director of U.S. DOT's Turner-Fairbank Highway Research Center (TFHRC); (2) Mr. Benjamin Tang, Principal Bridge Engineer for the Office of Bridge Technology at FHWA; (3) Dr. Kevin Womack, Director of the Utah Transportation Center and Professor of Civil and Environmental Engineering at Utah State University; (4) Mr. Harry Lee James, Deputy Executive Director and Chief Engineer for the Mississippi Department of Transportation; and (5) Mr. Mark Bernhardt, Director of Facility Inspection for Burgess & Niple, an engineering firm.

Summary of Hearing

The hearing covered four main concerns: the effectiveness of current bridge testing methods and technologies; future research needs to improve bridge safety; the use of non-destructive testing methodologies and lessons learned from the Minnesota bridge collapse to evaluate which bridges are most susceptible to failure; and the effectiveness of technology transfer programs at FHWA and university Transportation Research Centers (UTRC). Chairman Gordon stated that the August 2007 Minnesota bridge disaster was a wake-up call on the safety of the Nation's infrastructure. He emphasized the need for the development of new technologies that could lead to a safer bridges and transportation infrastructure. Ranking Member Ralph Hall stated that ensuring the safety of the Nation's infrastructure is one of the basic responsibilities of government at all levels and that he hoped the witnesses would address how the challenge of improving the safety of infrastructure can be balanced with the Nation's other transportation needs.

Mr. Judycki discussed FHWA's research programs for bridge building techniques and materials and emphasized the role of in-

spections for maintaining bridges. He noted that some of this R&D was devoted to creating non-destructive inspection technologies to supplement current visual inspections. Mr. Judycki also testified that FHWA collaborates with local agencies, academic institutions, and the private sector to develop better technologies and facilitate the transfer of research into practice. Mr. Tang discussed testing and technology development activities at FHWA.

Mr. James testified that bridge inspection is very complicated as no single technology or method is suitable for all bridges and some bridges have been in operation since the 1930's. He noted that bridge repair funds were prioritized for those in the most imminent danger of collapse. He argued that continuous inspection technology would require a large initial source of funding but would be a more efficient use of resources in the long-term.

Dr. Womack noted that traffic across bridges today carries far heavier loads than the bridges were originally designed to accommodate. He offered several areas of research that would have beneficial returns for bridge safety including a better understanding of how bridges age and deteriorate and the development of better construction methods. However, Dr. Womack testified that the lack of funding left federal highway research facilities underutilized. He recommended that the Federal Government assume some of the expense for states to implement new technologies to encourage their adoption.

Mr. Bernhardt explained that the quality of the data supplied to decision-makers determined whether inspection and maintenance resources were wisely allocated and that visual inspections are highly variable and subjective. Because newer technologies can perform inspections more objectively, funding for the development of these technologies should be a high priority. Mr. Bernhardt also stressed the importance of training for new inspection technologies, noting that State transportation agencies will not employ them if the training is unavailable.

4.1(l)—Meeting the Need for Inter-operability and Information Security in Health IT

September 26, 2007

Hearing Volume No. 110-57

Background

On Wednesday, September 26, 2007, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to examine progress toward the broad use of information technology in health care and the investments in technology and standards development that are needed to create a national system of secure, inter-operable health care information technology. The witnesses also provided their comments and views on H.R. 2406, a bill to support the development of standards for health care information technology systems by the National Institute of Standards and Technology (NIST), and their views on what the government can do to accelerate the adoption and usage of electronic health care records and other health care IT systems while protecting patient privacy.

The witnesses were: (1) Ms. Linda L. Kloss, Chief Executive Officer of the American Health Information Management Association (AHIMA); (2) Dr. David E. Silverstone, Clinical Professor at Yale School of Medicine and Assistant Chief of Ophthalmology at Yale New Haven Hospital and Chairman of the Health Information Technology Committee of the American Society of Cataract and Refractive Surgery; (3) Mr. Michael Raymer, Vice President and General Manager for Product Strategy and New Business Initiatives at GE Healthcare Integrated IT Solutions; (4) Ms. Noel Williams, President of the Hospital Corporation of America (HCA) Information Technology & Services, Inc.; and (5) Mr. Justin T. Barnes, Vice President of Marketing and Government Affairs for Greenway Medical Technologies, Inc.

Summary of Hearing

The hearing examined several important issues, including: what the Federal Government can do to accelerate the development and promulgation of standards for inter-operability of health care IT systems; how to make an inter-operable health care IT system compatible with patient privacy and data security; and R&D needs to adapt inter-operable health care IT systems to new technologies in the medical field. Chairman Gordon began by noting that the health care industry lags far behind other sectors in adopting IT, and that he believes one of the most significant reasons for this is the lack of technical standards for inter-operability and patient privacy. He further noted that NIST is uniquely positioned to address this issue because of its expertise in working with the financial industry and others in transitioning to an IT-based business model. He concluded by stating that while H.R. 2406 is not a complete solution to the problems facing health care IT, it was his hope that it would serve as a starting point for broader efforts needed to move towards a fully inter-operable health care IT system. Ranking Member Ralph Hall noted that IT could bring great potential savings and improvements in care. He agreed that NIST has a role to play in health care IT, but was interested to learn how H.R. 2406 would affect health care efforts underway at the Department of Health and Human Services.

Dr. Silverstone testified that H.R. 2406 would help promote the widespread adoption of effective health care IT. He noted that health care IT has the potential to improve the quality of care and reduce costs, but those improvements will not be achieved without effective standards for communication and interaction among systems. He reported that adoption of IT systems has been slow by health care professionals and that most physicians do not feel confident making large investments in health care IT systems because of the costs and uncertainty about future compatibility with other systems. Finally, he noted that NIST is well equipped to address the technical challenges of health care IT enterprise integration.

Ms. Williams testified that IT in health care can improve care and lower costs. She reported that an American Hospital Association (AHA) survey found moderate increases in the use of IT by hospitals from 2005 to 2006, but hospitals continue to cite cost and a lack of inter-operability as barriers to adoption of IT systems. She noted that NIST has established itself as a valuable resource to the

public and private sectors in standards development, but AHA is concerned H.R. 2406 could give NIST overlapping responsibilities with other agencies. She observed that national leadership is needed to create an environment that will give hospitals confidence to make significant investments in IT.

Ms. Kloss testified that data content standards, particularly a standardized method of medical terminology, are an important issue which should be addressed by a public/private authority. She also stated that there is an important role for NIST in bringing standards development and resources to health care IT standards harmonization efforts, which are currently largely voluntary. She noted that NIST could supply this effort with standards expertise and a test laboratory.

Mr. Raymer testified that current health care IT standards efforts by existing public/private collaborations such as the Health Information Technology Standards Panel (HITSP) are effective in establishing standards. He stated that G.E. supports the expansion of NIST's efforts as envisioned in H.R. 2406, as long as it would not interfere with the existing process. He cited four specific areas in which NIST could contribute: coordinating federal health care IT efforts; enforcing federal compliance with health care IT standards; coordinating standards conformance testing of inter-operability standards; and conducting needed research in health care IT.

Mr. Barnes testified that his company's customers have realized annual savings of between \$21,000 and \$81,000 per physician by installing health care IT systems. He noted that NIST already plays an important role in supporting standards development efforts in the public and private sectors, and that Greenway supports efforts to have NIST expand its work in health care IT enterprise integration, and that NIST should work collaboratively to enhance the existing HITSP process.

4.1(m)—Aviation Safety: Can NASA Do More to Protect the Public?

October 31, 2007

Hearing Volume No. 110-70

Background

On Wednesday, October 31, 2007, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing on NASA policy regarding the agency's management of the National Aviation Operations Monitoring Service (NAOMS). NAOMS has been in the press due to NASA's refusal to release the data to an Associated Press (AP) reporter, offering the rationale that release of the information might undermine the flying public's confidence in the aviation system because it relates to safety. NASA's refusal to release this data has been widely condemned in the Nation's press. NASA's Administrator Michael Griffin has formally distanced himself from that rationale, but he has not yet made it clear when or even whether NASA will publicly release this data. The hearing sought to further illuminate the details of this issue.

The first panel had two witnesses: (1) Dr. Michael Griffin, Administrator, National Aeronautics and Space Administration; (2)

Mr. Jim Hall, Managing Partner, Hall and Associates LLC, and Former Chairman, National Transportation Safety Board (NTSB).

The second panel three witnesses: (1) Mr. Robert S. Dodd, Safety Consultant and President, Dodd & Associates LLC; (2) Dr. Jon A. Krosnick, Frederic O. Glover Professor in Humanities and Social Sciences, Stanford University; (3) Captain Terry McVenes, Executive Air Safety Chairman, Air Line Pilots Association.

Summary of Hearing

In his opening statement, Chairman Gordon noted that air traffic is expected to double by 2025, and the importance of maintaining air safety. He was troubled that NASA failed to release the NAOMS results and that it had cited protection of private companies as a reason for withholding information. He expressed hopes that the hearing would result in a reconstruction of the report and project by NASA and FAA. Ranking Member Hall emphasized that, though the data from the survey must be released in order to inform the public, it should be edited to protect specific individuals and businesses.

Dr. Griffin said he was displeased with the wording of NASA's public statement addressing the NAOMS issue, claiming it indicated NASA was protecting private interest over public safety and was unrepresentative of NASA's intentions. NASA is required to protect the anonymity of those who reported data for the survey, not the results themselves. He stated NASA will release all the data that it legally can, and he denied reports that NAOMS funding was prematurely cut. NASA's goal, Dr. Griffin explained, was to create algorithms that could be implemented for use by the FAA to analyze data and that the NAOMS results were much more extreme than those extrapolated from other aviation and aeronautics research methods. In response to some suspicion that data had been destroyed, he noted that Battelle, the prime contractor, has all of the original information on hand at their location, apart from NASA, and will be releasing a public report shortly.

Mr. Hall expressed the importance of open and transparent exchange of information to aviation safety. He stated that the intent of the 1996 White House Commission on Aviation Safety and Security was to improve safety through open safety research and communication and that NASA's refusal to release results unacceptable. When Chairman Gordon asked Dr. Griffin why he could not release the results that day, he responded that the report still included identifiable individuals and that it was not certified. Chairman Gordon was frustrated that the Committee had not received evidence of these assertions. Dr. Griffin said that the data could potentially be released by the end of the year and assured the Chairman he would submit examples for the record.

Ranking Member Hall asked Dr. Griffin whether he believed the release of confidential data would discourage pilots and aviation specialists from reporting to NASA and FAA in the future. Dr. Griffin said the present data would have that effect. Ranking Member Hall then asked Mr. Hall what other systems evaluate aviation safety and whether or not these systems are reliable. Mr. Hall responded that NASA has the ASRS system, which is confidential.

He said this fact made it questionable that NAOMS could not achieve similar confidentiality.

Rep. Costello made it clear that it is a priority of the Congress to encourage the release of these reports. He asked whether Dr. Griffin had requested that Battelle work on scrubbing the information around-the-clock in order to release the report as soon as possible. Dr. Griffin said he had not, but that he had encouraged them to make it a priority.

Rep. Sensenbrenner asked which center was responsible for delay in releasing the survey, and Rep. Mitchell asked why NASA would invest in a survey that did not meet their standards. Dr. Griffin said the survey was supervised by the Ames Research Center, and that NASA had not managed the project well due to other priorities. Rep. Udall noted that Dr. Griffin had said funding was not cut short, yet the data was not peer reviewed and in a form that could be used. He said if the project was properly completed, the data should be available. Rep. Miller asked the Administrator if he disagreed with Mr. Dodd, who in his testimony said the data was valid. Dr. Griffin did disagree.

During the second panel, Mr. Dodd suggested that Congress fund a NAOMS-like program, separate from NASA, so that the program would be unbiased. Mr. Krosnick stated that NAOMS was, in fact, peer reviewed, is a very accurate and commendable program, was cut short, and that airlines and pilots would definitely not be identifiable, were the data released. Capt. McVenes, on the other hand, testified the data did not correlate well with other data, and that NAOMS was only a test of the methodology. He suggested NASA complete its peer-review of the data. Both Dr. Krosnick and Mr. Dodd indicated that the project was cut short due to funding.

4.1(n)—NASA's Fiscal Year 2009 Budget Request

February 13, 2008

Hearing Volume No. 110-75

Background

On Wednesday, February 13, 2008, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing on the National Aeronautics and Space Administration's (NASA) Fiscal Year 2009 Budget Request and NASA's proposed Fiscal Year 2008 Operating Plan.

The witness was Dr. Michael D. Griffin, Administrator, National Aeronautics and Space Administration.

Summary of Hearing

Chairman Gordon began the hearing by noting that the hearing's purpose is to examine where NASA is headed and whether that is an appropriate path for the next Administration. He criticized the current Administration for failing to provide adequate resources for NASA to execute its responsibilities outlined in the *Authorization Act*. He also pointed out that the increased funding going into Earth Science missions is actually just being taken from other programs, as the budget request provides no additional funds for these

missions. His greatest chief concern was leaving an under-funded NASA for the next Administration.

Ranking Member Hall noted that, despite a national budget that he sees as favoring NASA, the agency is under enormous financial strain with the retirement of the Shuttle, the development of a replacement vehicle, and continued research investments. Ranking Member Hall realized that overall budget constraints make funding increases a weighty proposal, and he expressed approval of Dr. Griffin's budget priority choices in light of such constraints.

Space and Aeronautics Subcommittee Chairman Udall echoed Chairman Gordon's concerns that the demands placed upon NASA far exceed the corresponding funding to make those demands a reality. He also leveled criticism at the White House for refusing to pass the bipartisan bill for greater funding for the Constellation Program, which will develop new vehicle technology to replace the Shuttle upon its retirement. Space Subcommittee Ranking Member Feeney echoed these sentiments.

In his testimony, Dr. Griffin responded that efforts are underway to make NASA more open for private investment and the commercial sector, so as to not depend entirely on public funding. Regarding the gap between the Shuttle's retirement and the launch of the Orion Crew Exploration Vehicle, he firmly emphasized the unpleasantness of what now seems to be a necessity: relying on Russian transportation services to the ISS. With some frustration he noted that there currently is no other viable option. He claimed that the Orion could be ready as early as 2013 and urged Congress to fully fund NASA's space exploration initiative.

During the lengthy discussion session, the main concern was the gap between the retirement of the Shuttle and the development of a replacement manned system. Dr. Griffin responded to these concerns that the replacement system had to be based on an entirely new system, because no current system could be upgraded to meet the new Constellation vehicle requirements. He also emphasized the need to consolidate gains on the Moon before rushing to Mars, as some space policy experts have suggested. Dr. Griffin also denied reports that the launch date for a Shuttle replacement system was being delayed and that funds are currently being invested in Mars-mission technology. He emphasized that, even with increased funding, the Constellation program's earliest launch date would be 2013.

***4.1(o)—Funding for the America COMPETES Act in
the Fiscal Year 2009 Administration Budget Request***

February 14, 2008

Hearing Volume No. 110-76

Background

On Thursday, February 14, 2008, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to consider how the Administration's FY 2009 budget proposal addresses programs authorized in the *America COMPETES Act* (P.L. 110-69) within the jurisdiction of the Committee. Subcommittees held additional hearings regarding specific agency budgets, in-

cluding for the National Science Foundation (NSF), National Institute of Standards and Technology (NIST), and Department of Energy (DOE).

The only witness was Dr. John H. Marburger III, Director of the Office of Science and Technology Policy (OSTP), and Co-Chair of the President's Committee of Advisors on Science and Technology (PCAST).

Summary of Hearing

Chairman Gordon opened the hearing by expressing the importance of the *America COMPETES Act* to the Nation's competitiveness in a changing global marketplace. He pointed out that while the Administration's budget is supportive on basic research, it is weak on several other critical components, particularly K–12 education programs at NSF. He expressed concerns about the lack of sufficient funding for the Manufacturing Extension Program (MEP) at NIST, and the Robert Noyce Scholarship Program at NSF.

Ranking Member Hall praised some aspects of the Administration's budget proposal, such as the increased funding for the Advanced Energy Initiative at DOE, but shared Chairman Gordon's concern regarding the lack of funding for the MEP and the Robert Noyce Scholarship Program. Rep. Hall also suggested that the proposed increase for NASA may not be sufficient to achieve the goals laid out in the President's *Vision for Space Exploration* announced at the beginning of 2004.

Dr. Marburger presented highlights of the Administration's FY 2009 R&D budget proposal, including the overall increases provided for NSF, DOE's Office of Science and NIST. During the question and answer portion of the hearing, Dr. Marburger answered Committee questions about: K–12 science and math education priorities; how the Administration's budget addresses the recommendations of the National Nanotechnology Initiative; funding for the social sciences at the NSF; science diplomacy; funding or lack thereof for the DOE International Fusion Initiative called ITER, and the Advanced Research Projects Agency for energy called ARPA-E; and a number of other budget and policy issues across the R&D agencies.

4.1(p)—Competitiveness and Innovation on the Committee's 50th Anniversary With Bill Gates, Chairman of Microsoft

March 12, 2008

Hearing Volume No. 110–84

Background

This year, the Committee on Science and Technology celebrated its 50th Anniversary. On Wednesday, March 12, 2008, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to highlight the occasion and to receive testimony from Bill Gates, the Chairman of the Microsoft Corporation, to discuss our country's technological advances over the past 50 years, the current state of our country's competitiveness, and a look ahead to the challenges we face.

The only witness was Mr. William H. Gates, Chairman of the Microsoft Corporation.

Summary of Hearing

Chairman Gordon opened the hearing with a statement focusing on the great technological advancements the United States made in the fifty years since Sputnik. He went on to stress that, with rapid economic and technological advances in other countries, we are likely on the cusp of another Sputnik moment. He explained that he believes the Science and Technology Committee has an important role to play in bringing our country back as a leader in innovation and technological development. Ranking Member Hall echoed Chairman Gordon's sentiment, while further highlighting the Committee's accomplishments over the past fifty years. Rep. Baird and Rep. Reichert, both from Washington State, offered introductory remarks as well and welcomed Mr. Gates.

Mr. Gates testified about the importance of information technology, and how it will help us address a variety of important global challenges. He offered reasons for why he believes our country's leadership in innovation is at risk, and suggested ways in which the government, private, and non-profit sectors can work together to address the challenges ahead. He focused much of his testimony on the urgent need to improve education in our country, in order to produce the top scientists and engineers. He recommended that Congress fully fund the *America COMPETES Act*, and stressed how the Act would significantly increase funding for many teacher training and scholarship programs as well as crucial basic research at the NSF. He also recommended that our immigration policies be reformed in order to ensure that foreign-born scientists can work and contribute in the U.S.

Members asked about aspects of visa policy and processing, including general work permission, appeals, "bars" in the exchange visitor program and timing of eligibility for H1-B visas. All of the witnesses agreed that visa policies and practices could still be strengthened from a security perspective while easing the flow of students and scholars that are indispensable to the U.S. science and engineering enterprise.

**4.1(q)—The National Nanotechnology Initiative
Amendments Act of 2008**

April 16, 2008

Hearing Volume No. 110-93

Background

On Wednesday, April 16, 2008, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to review legislation that proposes changes to various aspects of the planning and implementation mechanisms for and to the content of the National Nanotechnology Initiative (NNI).

Witnesses for the hearing included: (1) Mr. Floyd E. Kvamme, Co-Chair, President's Council of Advisors on Science and Technology; (2) Mr. Sean Murdock, Executive Director, NanoBusiness Alliance; (3) Dr. Joseph Krajcik, Associate Dean for Research and

Professor of Education, University of Michigan; (4) Dr. Andrew Maynard, Chief Science Advisor, Project on Emerging Nanotechnologies, Woodrow Wilson Center; (5) Dr. Raymond David, Manager of Toxicology, BASF Corporation on behalf of the American Chemistry Council; and (6) Dr. Robert R. Doering, Senior Fellow and Research Strategy Manager, Texas Instruments and on behalf of the Semiconductor Industry Association.

Summary of Hearing

Chairman Gordon began by noting that the draft *NNI Amendments Act* reauthorization bill makes two improvements to the existing framework: reduce the risks of bringing nanoscale materials into the commercial sector and capture the economic benefits of specific nanotechnology. Rep. Ehlers reiterated the need to prioritize EH&S research to encourage industry and public success of nanotechnology and observed that education was a third improvement in the new bill.

Mr. Kvamme cited the successes of the NNI to date, but called the bill's mandated 10 percent allocation towards EHS research unjustifiable. However, he lauded its flexibility to meet the needs of the next presidential administration. Mr. Murdock emphasized the changes that have occurred in nano-research in the five years since NNI was created. He praised the draft bill for accommodating these changes, particularly as American companies shift from prototype development to large-scale manufacturing, and supported funding for EHS, including the 10 percent allocation.

Dr. Krajcik spoke on the bill's educational components, noting that advances in nanoscience require a commensurate response from the educational community. He argued that both the Federal Government and the private sector have responsibilities to improve education in this regard. Dr. Maynard proposed five areas were essential to developing safe and successful nanotechnology: a top-level research strategy to identify goals across federal agencies, the 10 percent allocation towards EHS, a high-level coordinator charged with oversight of all nanotechnology EHS research, partnerships with the private sector, and government transparency.

Dr. David praised the bill for improving the U.S.'s capabilities to implement research programs, particularly EHS research, arguing that it would consolidate the strengths of federal organizations and make information more available to researchers. He also recommended how to successfully implement the provisions contained in the bill. Dr. Doering discussed four research and development areas of national importance that benefit from nano-research.

During the discussion period, the witnesses offered Chairman Gordon further input on EHS funds allocation, including the proposed 10 percent reserve mandate. Representative Hooley inquired about public education on nanotechnology and its applications, and the witnesses offered their suggestions and support for greater education efforts. Panelists commended the bill for its provisions to address commercializing nanotechnology applications. They also argued for an emphasis on interagency cooperation and comprehensive oversight.

The conversation then turned to the potential for industry participation in EHS research and education. Mr. Murdock and Dr.

Doering, representing the private sector, agreed that companies already carry out extensive safety tests on new material and products and sponsor limited EHS research. Rep. Rohrabacher noted difficulty in prioritizing money for scientific research, and asked witnesses to provide justification for the programs they advocate; the panel gave little response. Mr. Rohrabacher then asked whether math and science teachers in secondary education should be paid more than those in other subjects. Witnesses agreed that the best quality scientific education should be attained through whatever means possible.

Former Committee Member Honda made a statement in support of nano-research, and Rep. Gordon cited the *America COMPETES Act's* successful passage. Rep. Lipinski inquired about the state of general nanotechnology research and development in regard to energy sources, and Mr. Murdock described progress in solar and battery technologies. Lastly, Rep. Richardson asked what can be learned from the European Union's approach to nanotechnology risk research, which led to a discussion on the distinctions between EU and American programs.

4.1(r)—Opportunities and Challenges for Nuclear Power

April 23, 2008

Hearing Volume No. 110-94

Background

On Wednesday, April 23, 2008 the House Committee on Science & Technology held a hearing entitled "*Opportunities and Challenges for Nuclear Power*." The hearing explored the potential for nuclear power to provide an increased proportion of electric generating capacity in the U.S. Nuclear power generation offers the opportunity for increasing electricity generation without associated increases in greenhouse gas emissions, however, challenges to this expansion remain including high costs, waste disposal, and concerns about nuclear proliferation issues. The hearing also examined the Department of Energy's programs to support and advance nuclear technologies and their potential to address the challenges associated with expansion of nuclear power generation.

The Committee heard from the following witnesses: (1) Mr. Robert Fri, Visiting Scholar, Resources for the Future, and the Chair of a recent study conducted by the National Academies on the Department of Energy's nuclear research and development program; (2) Mr. Jim Asselstine, Managing Director (retired), Lehman Brothers, and former Commissioner, Nuclear Regulatory Commission; (3) Dr. Thomas Cochran, Senior Scientist, Nuclear Program, Natural Resources Defense Council (NRDC); (4) Mr. Robert Van Namen, Senior Vice President, Uranium Enrichment, USEC; (5) Ms. Marilyn Kray, President, NuStart Energy, and Vice President, Project Development, Exelon Nuclear; and (6) Vice Admiral John Grossenbacher, Director, Idaho National Laboratory.

Summary of Hearing

Chairman Bart Gordon (D-TN) opened the hearing by discussing the importance of having a technology plan moving forward with regards to nuclear power.

Congressman Brian Bilbray (R-CA) indicated that nuclear power could be an important and safe source of power.

Ms. Kray testified on challenges presented by nuclear power including licensing, cost, and workforce development.

Dr. Van Namen testified on nuclear fuel supplies including mining and milling natural uranium, conversion of natural uranium to uranium hexafluoride, and fuel fabrication. Van Namen also discussed nuclear power development and noted that the current credit market crisis could hinder the chances of receiving loans for nuclear energy projects from the Department of Energy. He closed by saying the Congress needs to implement legislative directives at the agency level according to market needs.

Mr. Asseltine's testimony focused primarily on the financial aspects of investing in nuclear energy. He explained that it is necessary that nuclear companies and investors are confident in the necessity of new nuclear plants as well as the companies' ability to recover its capital investments before making any decisions about building more plants. He believed that the financial support provisions in the *Energy Policy Act of 2005* could provide sufficient support for the development of nuclear power plants in the United States.

Dr. Cochran offered several suggestions for Congress to strengthen the nuclear industry—that Congress pass a climate bill, stop subsidizing construction of new nuclear power plants, terminate DOE's effort to close the nuclear fuel cycle, and instruct DOE to initiate a search for second geologic depository for the disposal of spent fuel.

In his testimony Dr. Fri summarized a submitted report reviewing the DOE's nuclear energy R&D budget. The Committee recommended that the Department give highest priority to the NP2010. NP 2010 is a program to assist in the licensing of the first new nuclear power plant in the U.S. in over 30 years. If nuclear power is to play a major role in the Nation's energy picture, it's essential to license, build, and operate the first of the new generation of reactors. And given the long lead times and construction periods involved, it's important to do so now. The committee also noted that the human and intellectual infrastructure needed to support this effort is aging, and recommended continued funding for university programs and research for the industry.

Vice Admiral Grossenbacher discussed the elements of DOE's Nuclear Energy Program, which include: Nuclear Power 2010, Light Water Reactor R&D, the Advanced Fuel Cycle Initiative, Generation IV nuclear energy systems development, and investments in human capital.

Chairman Gordon began the first round of questions by asking Mr. Fri and Admiral Grossenbacher about cost estimates for the proposed Global Nuclear Energy Partnership (GNEP) program. Both witnesses agreed that, although there was not a "definitive process" for determining cost, it would be a significant investment involving tens of billions of dollars. They explained GNEP is a long-

term program and suggested an outside advisory committee to oversee the project. Dr. Cochran, on the other hand, was less optimistic. He said that GNEP program was doomed to failure because similar programs to develop “fast breeder reactors” around the world had all failed and would increase proliferation risks.

Rep. Gingrey (R-GA) asked Dr. Cochran to clarify his position on Yucca Mountain and waste storage. Dr. Cochran said that there was not any EPA criteria to work with but did explain the process of site selection for nuclear depositories.

Rep. Matheson (D-UT) asked the witnesses to comment on his legislation for on-site storage for nuclear waste. Ms. Kray said that such storage did not pose additional risk and Mr. Van Namen expressed his support as well.

Rep. Baird (D-WA) asked for the total net federal subsidies going into nuclear energy. Acknowledging that it was difficult to quantify, Dr. Cochran said that subsidies were in the area of \$150 billion over the lifespan of the industry. Mr. Asselstine said that about \$26 billion over the next 20 years would be needed to support 25 to 30 new plants.

Rep. Rohrabacher (R-CA) asked the panel about High Temperature Gas-Cooled (HGTC), or Generation IV, reactors and expressed his concern that a promising technology was being ignored. Ms. Kray said that it had not been certified by the NRC, it had licensing issues and that there were substantial bureaucratic costs involved. Both Ms. Kray and Admiral Grossenbacher acknowledged the potential of the newer reactors but indicated that they believed the technology had yet to mature.

4.1(s)—Electronic Waste: Can the Nation Manage Modern Refuse in the Digital Age?

April 30, 2008

Hearing Volume No. 110-98

Background

On Wednesday, April 30, 2008, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to consider electronic waste, which includes obsolete and broken televisions, computers, laptops, cell phones, and other electronic equipment. The hearing looked at this growing problem and the potential for R&D to increase the efficiency and effectiveness of recycling and re-use.

The witnesses were: (1) Dr. Eric Williams, Assistant Professor of Civil and Environmental Engineering, Arizona State University; (2) Mr. Gerardo Castro, Director of Contracts and Environmental Services, Goodwill Industries of Southern California; (3) Ms. Renee St. Denis, Director of America’s Product Take-Back and Recycling, Hewlett Packard Co. (HP); (4) Mr. Eric Harris, Associate Counsel and Director of Government and International Affairs, Institute of Scrap Recycling Industries (ISRI); (5) Mr. Ted Smith, Chair, Electronics Take-Back Coalition; and (6) Mr. Michael Williams, Executive Vice President and General Counsel, Sony Electronics Inc.

Summary of Hearing

Chairman Gordon opened the hearing by stating that Americans have generated a staggering volume of e-waste that is now headed to landfills, stored, or exported for disassembly overseas under unsafe conditions. He pointed out that while electronics contain valuable materials, they also can contain lead, mercury, and other hazardous materials that must be dealt with safely. Ranking Member Ralph Hall echoed the Chairman's concern about the immense volume of e-waste, and said that he hoped to hear ways in which designs for these products could improve to stem the generation of this class of waste in the future.

Dr. Williams explained that because technology improves rapidly, products designed to last many years are often discarded when a new model reaches the market. He noted that there exists no conclusive evidence that landfill disposal of these products is necessarily dangerous to the environment or human health, but that electronics production is environmentally intensive. Thus, more effective re-use markets could be a valuable tool. Dr. Williams also expressed concern about conditions created in foreign countries by exporting e-waste. Mr. Castro discussed Goodwill's achievements in recycling and re-selling computers and other electronics, citing a helpful fee system in California that helps pay for recycling televisions and computer monitors. He urged the Federal Government to encourage the not-for-profit sector in e-waste recycling through special tax-incentives.

Ms. St. Denis discussed HP's efforts to use and recycle materials responsibly, noting that HP changes the design of their products to make them more easily recycled, exports no waste overseas, sends no electronic materials to landfills, and practices environmentally sound recycling. Mr. Harris detailed the scope of ISRI members' operations, stressing the need for manufacturers to start designing products with recycling in mind and for improved markets for scrap plastics and glasses. He also suggested enacting a reward system for companies who recycle responsibly.

Mr. Smith provided details on harmful informal recycling operations. He stressed the importance of producer responsibility over the entire life of the product, not just until it reaches the consumer, and argued that the Federal Government must both prevent the export of hazardous waste and encourage green design and green engineering. Mr. Williams discussed Sony's environmental stewardship program, which accepts and recycles all Sony products free of charge. He stated Sony's goal is to reach 150 collection points and one recycling center in each state by September 2008. Sony recycles the products locally and responsibly, seeking a 95 percent recycling rate. Mr. Williams also highlighted two Sony products that are environmentally friendly and completely recyclable.

The discussion period focused on the need for R&D efforts to increase the effectiveness and efficiency of environmentally sound e-waste recycling, products that can be more easily recycled, and increased product re-use.

4.1(t)—STEM Education Before High School: Shaping Our Future Science, Technology, Engineering and Math Leaders of Tomorrow by Inspiring Our Children Today

May 12, 2008

Hearing Volume No. 110-101

Background

On Monday, May 12, 2008, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to receive testimony on efforts to engage students in math and science at an early age, to keep them interested throughout middle school and high school, and to translate that interest into rewarding careers that will be of benefit to the entire Nation from a federal, school district, university, industry and teacher perspective. The hearing was held at the Martha and Josh Morris Mathematics and Engineering Elementary School in Texarkana, Texas, and thus examined the efforts behind and reasons for the establishment of a STEM-based public elementary school and the progress that it is making with its students, which could serve as a model for the Nation.

There were five witnesses: (1) Dr. Cora Marrett, Assistant Director for the Education and Human Resources Directorate, NSF; (2) Mr. James Henry Russell, Superintendent, Texarkana Independent School District; (3) Dr. Roseanna Stripling, Provost and Vice President for Academic Affairs, Texas A&M University-Texarkana; (4) Mr. Michael Leherr, Plant Manager, Alcoa-Texarkana; and (5) Dr. David Smedley, Science Teacher, North Heights Junior High School.

Summary of Hearing

Chairman Gordon opened the hearing with a brief statement then passed the gavel to Ranking Member Hall to preside over the hearing. Ranking Member Hall asked for unanimous consent that Mr. Tom Pickens, CEO of SpaceHab, take a seat at the witness table and take part in the question and answer period along with the witnesses. Mr. Hall went on to praise the Martha and Josh Morris Mathematics and Engineering Elementary School and the Texarkana Independent School District for their “visionary ideas” in establishing their STEM education collaborative program.

Chairman Gordon echoed Mr. Hall’s sentiments and went on to stress the importance of improving STEM education in the United States in terms of international competition.

In her testimony, Dr. Marrett stressed effective STEM education programs rely on “student interest, professional development, and tools for learning.” She stated that recent studies show that there is significant student interest in STEM areas, that professional development programs for teachers directly improve the education of those teachers’ students, and that NSF-supported educational materials and resources can accelerate student learning. Lastly, Dr. Marrett mentioned “the nations whose students excel” in math and science begin to introduce “the fundamental concepts early in their

careers.” Mr. Leherr testified that each time his company, Alcoa Texarkana, seeks a new professional recruit, the applications are increasingly from candidates educated outside of the United States, and decreasingly from local candidates. “It is evident that the local and national availability of highly skilled people is getting smaller.” Mr. Smedley expressed his opinion that “the single most important” thing that the Federal Government can do to improve K–12 science education is “to nationally align the teaching of science content.”

4.1(u)—Water Supply Challenges for the 21st Century

May 14, 2008

Hearing Volume No. 110–102

Background

On Wednesday, May 14, 2008, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to examine the challenges of managing water supplies to meet social, economic and environmental needs in the United States, given population growth, climatic variation, and other factors.

The witnesses were: (1) Dr. Stephen Parker, Director, Water Science and Technology Board, National Research Council; (2) Dr. Jonathan Overpeck, Director, Institute for the Study of Planet Earth, and Professor, Geosciences and Atmospheric Sciences, University of Arizona; (3) Dr. Robert Wilkinson, Director, Water Policy Program, Bren School of Environmental Science and Management, University of California–Santa Barbara; (4) Mr. Marc Levinson, Economist, U.S. Corporate Research, JPMorgan Chase; (5) Dr. Roger Pulwarty, Program Director, National Integrated Drought Information System (NIDIS) NOAA Climate Program Office.

Summary of Hearing

Chairman Gordon began the hearing by highlighting the importance of evaluating the Nation’s water resources given upcoming challenges, including increased population and competition for water supplies, recent droughts, degraded water quality and climate change. With investment in research and development, public education, and more available information, such challenges can be met. Ranking Member Hall emphasized the importance that water resources have in every sector of the Nation’s economy, recalling the *National Integrated Drought Information System Act of 2006*, which created a centralized location for national drought information, and stated his hope that the panel would produce suggestions for similar tools and resources to be used by decision-makers.

Dr. Parker testified that while water supply remains fixed, demand continues to grow in every region of the country. He maintained that solutions to this problem will require science-based strategies and innovative water technologies. Dr. Overpeck discussed the specific threat of climate change, noting that rising temperatures have already led to changes in the Nation’s water cycle. Potential solutions to this challenge include an accelerated effort to understand climate-related water supply variability, incorporation of climate change factors into water supply models, research into

groundwater supply replenishment, and modeling water supply allocation during droughts. Dr. Wilkinson emphasized the over-allocation of national water supplies and frequency of regional droughts. He then called for a re-evaluation of legal, technical, and economic procedures for managing water resources that incorporates the climate change risk. Mr. Levinson discussed the lack of awareness among investors and corporations concerning water scarcity, and suggested two approaches to improving responsible corporate resource use: to press states to apply methods of pricing groundwater withdrawals and to encourage research on decentralized water treatment methods. Dr. Pulwarty described the progress made by NIDIS, a program designed to assess drought-related risks and to provide support tools to decision-makers.

Both Chairman Gordon and Ranking Member Hall asked the witnesses for specific contributions that the Committee could make toward research and development. Witnesses' recommendations ranged from funding towards research on the effects of climate change on groundwater to improving efficient water use in energy systems, to public education programs.

Ranking Member Hall then asked about information and technology available to water managers in the United States in comparison to that available in other countries. Dr. Parker replied that the U.S. lies ahead of the rest of the world in terms of data collection and information available. Rep. Hall followed with a question on the relationship between biofuel crop production and the NIDIS drought database, and Dr. Pulwarty responded that he believed farmers generally do not base planting decisions on the NIDIS drought information.

Rep. Johnson asked what can be done to remedy the shortage of qualified people working on water problems. In response, Dr. Overpeck reiterated the need for public education campaigns that encourage cooperation between all citizens, not only water managers. When asked how such campaigns could be funded, Mr. Levinson advocated relying on private investment to support research and development.

Rep. Rohrabacher expressed concern over the assumption that water shortages are caused by human activity. The witnesses stated that while the origins of the current droughts are not yet known, droughts are exacerbated by higher temperatures, thereby implying a link between human activity and water. In response, Congressman Rohrabacher stated his disapproval toward the witnesses' testimonies for reasserting the man-made global warming theory. Moving on to another issue, he then suggested the Committee consider the high-temperature gas-cooled nuclear reactor, which requires no water intake, as an alternative to the traditional nuclear reactor.

Rep. Baird asked the witnesses whether the national scientific community has a sense of the country's water carrying capacity, especially as population continues to grow. They noted that water capacity has grown because efficiency programs and infrastructure improvements have led to lower water use per capita (though overall demand continues to rise).

The questions then turned to the state of water quality, purification, and desalinization efforts. Members were concerned that lit-

tle information exists nationally on the frequency of water contamination and water-borne disease. The witnesses acknowledged that more research is needed in these areas.

Rep. Smith inquired about the application of surface storage to mitigate the threat of climate change. Witnesses answered that such an idea may be problematic because storage infrastructure is already employed in flood control and because of evaporation. Below-ground storage is a potential alternative, though it requires much additional research.

As a final question, the witnesses were asked to discuss the role of the EPA in long-term water efficiency and conservation effort policies. The witnesses viewed EPA primarily as an advocating entity and less as one producing research, given its tight budget. They commended the bills reported by the Committee authorizing additional research funds for the EPA and DOE.

4.1(v)—NASA at 50: Past Accomplishments and Future Opportunities and Challenges

July 30, 2008

Hearing Volume No. 110–118

Background

On Wednesday, July 30, 2008, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to mark the 50th anniversary of the establishment of the National Aeronautics and Space Administration (NASA), review the accomplishments achieved since its creation, and examine its future challenges and opportunities.

Witnesses for the hearing included: (1) Honorable John H. Glenn, Jr., Retired U.S. Senator; (2) Mr. Norman R. Augustine, Chairman and CEO (retired), Lockheed Martin Corporation; (3) Dr. Maria T. Zuber, Dept. Head and E.A. Griswold Professor of Geophysics, Department of Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology.

A special audio message from Professor Stephen Hawking, Lucian Professor of Mathematics, University of Cambridge, was played at the hearing.

Summary of Hearing

Both Chairman Gordon and Ranking Member Hall applauded NASA for their accomplishments over the last 50 years in their opening statements. Mr. Glenn attested to the importance of both micro and macro exploration, and urged that in order for NASA to accomplish in the future what it has in the past, the program much be properly funded. Mr. Augustine noted the decreasing number of students graduating with engineering degrees as there were after NASA was established. Dr. Zuber applauded NASA's ability to carry out even the most challenging of tasks in the past, but also urged the Congress that NASA must continue exploration projects in order to stay competitive on a global scale.

The primary focus of the question and answer portion was how to adequately fund NASA in the coming years, and how to get young people interested in America's space program. All of the wit-

nesses agreed that it is necessary to do more to get future generations interested in space. Dr. Zuber emphasized the importance of incorporating creativity into NASA's education programs. Mr. Augustine argued that the science budget must be increased, and teachers down to the first grade level must understand science and math so they can provide above adequate teaching in these areas, in hopes of inspiring future generations to pursue a career in the sciences. He also added that corporations, universities, and national labs need to do more to work with young people and get them involved in the space program. Mr. Glenn also noted that technological innovation and efficient equipment are necessary to assure that U.S. astronauts can get into space with out foreign assistance. With regard to the budgetary issues, Dr. Zuber was unable to provide Rep. Baird with a dollar amount as to how much money the space program would need in the future. She compared it to the cost of curing cancer; while the exact cost is unknown, it is worth doing. Dr. Zuber explained that the issue of planetary defense is one that concerns not only the Department of Defense, but NASA as well, especially regarding potential threats such as asteroids and comets. The witnesses all believed that it is misleading by some to say that NASA's resources could be better spent on other domestic programs, arguing that investment in NASA helps provide larger benefits to society that aren't seen at the immediate time of investment. They added that maintaining that long-term investment approach will be a challenge. All of the witnesses agreed that while NASA has accomplished a great deal in the last 50 years, better funding for the space program as well as other scientific areas is necessary to secure a prosperous future for NASA.

***4.1(w)—Oversight of the Networking and Information
Technology Research and Development (NITRD)
Program***

July 31, 2008

Hearing Volume No. 110–119

Background

On Thursday, July 31, 2008, the Honorable Bart Gordon presiding, the Committee on Science and Technology held an oversight hearing to review the multi-agency, coordinated Networking and Information Technology Research and Development (NITRD) program. The hearing examined the current program in light of the recent assessment of the President's Council of Advisors on Science and Technology (PCAST) and explored whether additional legislative adjustments to the program are needed.

Witnesses for the hearing included: (1) Dr. Chris L. Greer, Director, National Coordination Office for Networking and Information Technology Research and Development (NCO/NITRD); (2) Dr. Daniel A. Reed, Director of Scalable and Multicore Computing, Microsoft; (3) Dr. Craig Stewart, Associate Dean, Research Technologies, Indiana University, and representing the Coalition for Academic Scientific Computation (CASC); and (4) Mr. Don C. Winter, Vice President—Engineering and Information Technology, Phantom Works, the Boeing Company.

Summary of Hearing

Chairman Gordon opened by stating that networking and information technology is a crucial component of our U.S. competitiveness, and federally sponsored research, in partnership with industry and universities, is essential to ensure further advances in the area. He and Ranking Member Hall expressed confidence in the NITRD program, and eagerness to better the program through recommendations by the PCAST and others.

In his testimony, Dr. Greer discussed the NCO/NITRD strategic plan and the implementation of the PCAST recommendations. Mr. Reed offered many recommendations, among those the need to fully fund the *America COMPETES Act*, to rebalance the participation in the NITRD program so the responsibility for fundamental research is not carried by a single agency, and the need to regularly review the research investment against the strategic plan. Dr. Stewart stated that the Coalition for Academic Scientific Computing fully supports the PCAST report recommendations, and he went on to provide additional recommendations. Mr. Winter expressed support of the proposed expansion of the NITRD program's research objectives to address cyber-physical systems. The discussion period included questions regarding software research resources, investments in high risk but high payoff research, international collaborations, and cyber security issues.

**4.1(x)—The Next Generation Air Transportation
System: Status and Issues**

September 11, 2008

Hearing Volume No. 110–122

Background

On Thursday, September 11, 2008, the Honorable Bart Gordon presiding, the Committee on Science and Technology held a hearing to examine the status of the Next Generation Air Transportation System initiative known as NextGen and explore key issues related to the initiative and the interagency Joint Planning and Development Office (JPDO), the organization entrusted with NextGen planning and research coordination.

Witnesses for the hearing included: (1) Ms. Victoria Cox, Senior Vice President for NextGen & Operations Planning, Air Traffic Organization, Federal Aviation Administration, (2) Dr. Gerald L. Dillingham, Director, Physical Infrastructure Issues, Government Accountability Office, (3) Mr. Calvin L. Scovel III, Inspector General, U.S. Department of Transportation, (4) Dr. Paul G. Kaminski, Chairman and CEO, Technovation Inc.

Summary of Hearing

Chairman Gordon opened the hearing by expressing the importance of the NextGen initiative to the Nation's economic vitality and addressed the engineering, management and regulatory challenges that the program faces. Ranking Member Hall reiterated these concerns and discussed the role of the JPDO in planning for and coordinating the research and development of NextGen.

Ms. Cox discussed the progress being made in the NextGen initiative, citing successes in fuel savings for trans-Atlantic flights and improved service operations at JFK airport as a result of the implementation of NextGen technology. Mr. Dillingham addressed the results of a study conducted by the GAO to answer questions regarding NextGen planning, research and development activities. Mr. Dillingham identified the key challenges for NextGen implementation: (1) a new configuration of ATC infrastructure, (2) increased airport capacity, (3) strong Congressional support. Mr. Scovel discussed the status of FAA's efforts to develop NextGen and made several recommendations which addressed the transition from existing systems to NextGen, how FAA is organized to manage and execute NextGen, and the actions needed from FAA to help NextGen efforts from research to implementation. Mr. Scovel identified five actions necessary for the success of NextGen: (1) Establish priorities and reflect them in budgets, (2) develop a strategy for technology transfer, (3) focus attention on airport issues, (4) develop a realistic plan for ADSB, (5) assess implementation bandwidth and develop transition benchmarks. Dr. Kaminski emphasized the importance of the NextGen initiative and discussed his proposal to accelerate the development and integration of the NextGen System. Mr. Waitz dealt with the issues of energy, aviation and the environment, citing the challenges of noise, air quality and climate change as key aspects of the NextGen initiative. Mr. Waitz claimed that the two most critical issues are to accelerate the FAA/NASA Aviation Climate Change Research Initiative and second, to significantly increase the focus, technology, operation, and alternative fuels programs in NASA and FAA.

During the discussion period, the witnesses offered Chairman Gordon recommendations to the next President concerning NextGen. These recommendations included improved leadership for NextGen and investments in environmental and aeronautical research. Chairman Gordon followed up on this topic by discussing the effects of FAA's reorganization on the NextGen initiative with Mr. Dillingham who stated that while it is still unknown how the reorganization will affect NextGen, the GAO still believes that a direct report of the JPDO Director to the FAA Administrator is the best arrangement. Ranking Member Hall asked Ms. Cox about the impact of continuous funding on NextGen. Ms. Cox emphasized the importance of maintaining a continuous funding stream for NextGen in order to carry out the plans already in place. He further questioned Mr. Dillingham and Mr. Scovel on OMB's ability to coordinate and align research budgets among participating federal agencies. Both witnesses noted a disconnect between the agencies that might be remedied by greater OMB management of the NextGen effort.

Mr. Waitz evaluated the development of alternative jet fuels to alleviate aviation's impact on the climate, stating that bio sources were especially promising and pointing out the problems with coal to liquid technology. Congressman Costello was skeptical of the FAA's capability and capacity to manage a project of this size and asserted that FAA's restructuring of the JPDO was a mistake. Congressman Gingrey continued the discussion of alternative fuels with Ms. Cox who cited FAA's increased R&D budget in the envi-

ronment between 2008 and 2009. Congresswoman Edwards and Congressman Ehlers asked the witnesses about budget allocations for the NextGen initiative and inquired as to how the FAA would acquire the personnel necessary to complete the project. Ms. Cox emphasized the importance of hiring specialists in systems engineering and information technology, stating that the NextGen program will require an additional 300 in-house professionals in order to support the level of work necessary for the success of the program.

4.2—SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

4.2(a)—H.R. 547, the *Advanced Fuels Infrastructure Research and Development Act*

January 30, 2007

Hearing Volume No. 110–1

Background

On Tuesday, January 30, 2007, the Subcommittee on Energy and Environment of the Committee on Science and Technology held a legislative hearing on H.R. 547, the *Advanced Fuels Infrastructure Research and Development Act* introduced by Chairman Bart Gordon.

H.R. 547 directs the Department of Energy (DOE) and the National Institute of Standards and Technology (NIST) to initiate a research, development, and demonstration program to make alternative bio-based fuels more compatible with present-day infrastructure. H.R. 547 also directs these agencies to develop technologies and methods to provide low-cost, portable, and accurate measurements of sulfur in fuels, and to develop a physical properties database and Standards Reference Materials for alternative fuels.

The hearing examined the infrastructure related challenges of adopting biofuels in the Nation's fuel marketplace and of transitioning to clean diesel fuels. The Committee received testimony from: (1) Mr. John Eichberger, Vice President of the National Association of Convenience Stores; (2) Mr. Bob Dinneen, President and CEO of the Renewable Fuels Association; and (3) Mr. Richard Kassel, Senior Attorney and Director of the Clean Fuels and Vehicles Project at the Natural Resources Defense Council.

Summary of Hearing

Mr. Eichberger described the substantial technical and cost barriers fuel retailers encounter in making the decision to sell biofuels such as ethanol and biodiesel. He also described retailers' concern that the lack of a sulfur testing methods hinders the market's ability to ensure ULSD quality controls and regulatory compliance and endorsed H.R. 547.

Mr. Dinneen described the current and future role of ethanol in fuel markets, the state of development of ethanol refineries, and the "Virtual Pipeline" of trucks, rail and barges the ethanol manufacturers must use to transport product from biorefineries to the marketplace. On behalf of the Renewable Fuels Association, Mr. Dinneen endorsed H.R. 547.

Mr. Kassel described the successful implementation of the Environmental Protection Agency's Highway Diesel Rule which man-

dates the use of Ultra Low Sulfur Diesel. NRDC supports H.R. 547 with modifications suggested in Mr. Kassel's testimony.

The Subcommittee also received written testimony and endorsements from the National Association of Truck Stop Owners, The Society of Independent Gas Marketers of America, the Petroleum Marketers Association of America, the National Association of Shell Marketers, The Coalition of E85 Retailers, X-Ray Optical Systems, and the Underwriters Laboratory which were inserted in the hearing record.

***4.2(b)—The Department of Energy Fiscal Year 2008
Research and Development Budget Proposal***

March 7, 2007

Hearing Volume No. 110-7

Background

On Wednesday, March 7, 2007 the Subcommittee on Energy and Environment held a hearing on the Department of Energy's (DOE) fiscal year 2008 Budget Request for research and development programs.

The Administration's FY08 budget request for DOE contains \$7.2 billion for civilian energy R&D, divided among five offices: the Office of Science, Energy Efficiency and Renewable Energy (EERE), the Office of Nuclear Energy, the Office of Electricity Delivery and Energy Reliability and Fossil Energy R&D. The Office of Science funds basic research at universities and 10 national laboratories and is the single largest federal supporter of physical sciences research. The FY08 budget request for the Office of Science is \$4.4 billion—an increase of approximately \$600 million or 16 percent over the FY07 enacted level. However, this falls \$189 million short of the funding levels authorized in Title IX of *Energy Policy Act of 2005*. Appearing for the first time in the President's budget is the Innovative Technology Loan Guarantee Program which would provide loan guarantees for advanced technology projects that avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases, and have a reasonable prospect of repaying the principal and interest on their debt obligations.

The Subcommittee heard testimonies from heads of five federal offices that oversee civilian energy research and development programs within DOE: (1) Dr. Ray Orbach, Under Secretary for Science and Director, Office of Science; (2) Mr. Dennis Spurgeon, Assistant Secretary for Nuclear Energy and Acting Undersecretary for Energy; (3) Mr. Alexander Karsner, Assistant Secretary for Energy Efficiency and Renewable Energy (EERE); (4) Mr. Kevin Kolevar, Director, Office of Electricity Delivery and Energy Reliability; and (5) Mr. Thomas D. Shope, Principal Deputy Assistant Secretary for Fossil Energy.

Summary of Hearing

Chairman Lampson (D-TX) opened the hearing by noting gaps in R&D, energy efficiency and state-of-the-art facilities funding, calling for more attention to the EPAct of 2005 and appropriate carbon-free nuclear energy policies. Rep. Inglis (R-SC) pointed out

the crucial distinction between simple spending and thoughtful investment and expressed interest in promoting energy independence, cleaner air, and job creation.

Dr. Orbach explained the DOE Office of Science's role as a basic research agency and offered the examples of cellulosic ethanol and intermittent energy sources (i.e., wind, solar and tidal) as Office of Science projects. He stressed the need to sustain a world-class scientific workforce and to remain internationally competitive.

Mr. Spurgeon discussed nuclear power as a carbon-free and dependable energy source. He also praised efforts like the Global Nuclear Energy Partnership (GNEP), but stressed that the United States needs infrastructure upgrades if we are going to be an industry forerunner.

Mr. Karsner analyzed the budget proposal in comparison to the 2007 request, detailing the monetary allotments for specific EERE energy projects, and called for accelerated R&D and the adoption of new technologies into commercial products.

Mr. Kolevar explained that the \$86 million request for the Office of Electricity Delivery and Energy Reliability would be allotted to four main activities: High Temperature Superconductivity; Visualization and Controls; Energy Storage and Power Electronics; and Renewable and Distributed Systems Integration.

Mr. Shope testified on the proposed 2008 budget for the Office of Fossil Energy. He claimed that their proposed budget of \$863 million would allow the Office to support the President's initiatives on clean air, coal research, energy security and climate change.

During the discussion, Full Committee Chairman Bart Gordon (D-TN) asked Mr. Spurgeon about the quality of the GNEP program. Mr. Spurgeon explained that while they have more research to do, GNEP has been reprocessing fuel throughout the world for 40 years. He later explained to Rep. Biggert (R-IL) that they are conducting a comprehensive systems analysis of GNEP. Regarding the repeal of funding for the Ultra-Deepwater and Unconventional Onshore Research and Development Program, Mr. Shope explained that while the President's budget requests its repeal, they intend to comply with the law as it exists, which at the time of the hearing included the operation of the program.

4.2(c)—The Environmental Protection Agency Fiscal Year 2008 Research and Development Budget Proposal

March 14, 2007

Hearing Volume No. 110-11

Background

On Wednesday, March 14, 2007 the House Committee on Science and Technology's Subcommittee on Energy and Environment held a hearing to examine the Environmental Protection Agency's (EPA) fiscal year 2008 (FY08) budget request for Science and Technology (S&T).

EPA's overall FY08 budget request is \$7.2 billion, a reduction of 5.5 percent compared to the FY06 enacted level of funding for the Agency. The request makes several changes to EPA's science re-

search programs, and some have argued that these changes will erode EPA's core research programs in ways that will limit understanding of the environment and hamper the Agency's ability to formulate sound policies. For example, the request eliminates the Superfund Innovative Technology Evaluation (SITE) Program and the Environmental Technology Verification (ETV) program. Both programs support developing and testing innovative technologies to cleanup hazardous substances. The budget also contains 31 percent reduction to the human health research programs that would reduce human risk associated with exposure to environmental hazards. Finally, the budget cuts \$10 million from the Science to Achieve Results (STAR) grant program, which provides research grants and graduate student fellowships.

Members heard from the following witnesses during the hearing: (1) Dr. George Gray, Assistant Administrator, Office of Research and Development (ORD) and Science Advisor for the U.S. Environmental Protection Agency; (2) Dr. M. Granger Morgan, Chair, EPA's Science Advisory Board (SAB), and Lord Chair Professor in Engineering and Professor and Department Head of the Department of Engineering and Public Policy at Carnegie Mellon University; (3) Dr. Jennifer Sass, Senior Scientist, Health and Environment, Natural Resources Defense Council; and (4) Dr. Bruce Coull, Dean Emeritus, School of the Environment, the University of South Carolina, and President of the U.S. Council of Environmental Deans and Directors, National Council for Science and the Environment.

Summary of Hearing

Dr. George Gray argued that the EPA Science & Technology (S&T) funds will focus on emerging priorities, while programs that are not as pressing or effective will be scaled back. He highlighted several ORD programs that continue to inform environmental decision-making, including: plans to integrate the National Ambient Air Quality Standards Research Program with the Air Toxics Program, nanotechnology risk assessment, ecosystem and river restoration, homeland security research, and climate change assessment with the U.S. Climate Change Science Program.

Dr. M. Granger Morgan, on the other hand, expressed concern over reduced funding and noted that between 2004 and the proposed 2008 budget, the overall support for Research and Development at EPA has declined by 25 percent. He explained that monetary limitations have caused, and continue to cause, EPA to perform more reactive than proactive research.

Dr. Sass testified that the budget cuts funding to core priorities such as susceptible populations, ecological research and human health research. Especially troubling are the elimination or diminished support for EPA's environmental libraries and the Integrated Risk Information System (IRIS), both of which provide publicly available information on toxics. Sass also expressed concern that EPA may be unable to carry out its own research, thus becoming increasingly reliant on data supplied by the very industries that it regulates and by paid contractors who often have clients or members from the regulated industries. Oftentimes industry data is suspect, but due to staff and resource shortages and Confidential

Business Information (CBI) protections that prevent public scrutiny to the data, EPA is unable to provide adequate oversight.

Finally, Dr. Coull testified that without investment in science and scientists, EPA cannot make science-based decisions. He agreed with Dr. Sass that the EPA libraries were extremely important to environmental study. He gave several examples where EPA research was indispensable, including assessing the risks of endocrine disrupters and mercury, but noted that these studies would no longer be adequately funded with the President's proposed budget.

Chairman Lampson (D-TX) questioned Dr. Gray about EPA's announcement that they would clean only 24 of the 40 Superfund sites that the agency initially indicated they would clean. He was especially troubled that the budget no longer supports the SITE program. Mr. Gray asserted that, since the SITE program has effectively created the technology to deal with the hazardous material, it is no longer a necessary program. He considers it now more appropriate for the private sector to handle these clean ups.

Chairman Lampson also asked if EPA is planning to reduce staff and close several laboratories. Dr. Gray denied these allegations, stating that EPA only has plans to analyze the efficiency of the laboratories in order to gain insight into how to make each lab run more effectively. Lampson requested that Mr. Gray provide Congress with information regarding these plans to consolidate, or to streamline, EPA's laboratories.

Representative Diaz-Balart (R-FL) asked Dr. Sass whether, because of the suspect nature of the data, Congress should wait to implement the Clean Air and Mercury rule. Dr. Sass responded that she believed it should be implemented, as a preventative measure, but that EPA should do further research on the subject. She also discussed that EPA will use a "Cap and Trade" plan, a plan based on the assumption that pollutants are distributed evenly. She stated that ignoring "hotspots" of hazardous materials hinder the efficacy of the program.

Rep. Diaz-Balart also questioned Dr. Sass on her opinion of the frequent delays and reviews during the IRIS process by OMB, the public, and interagency reviews. She said that though she thinks review is important, she believes EPA allows too much intervening throughout the process, causing more interference than positive input.

Representative Lipinski (D-IL) asked Dr. Gray whether studying and handling the pollution of the Great Lakes is a priority for EPA. Mr. Gray said that, despite budget cuts, EPA will continue to fund this research.

All of the witnesses voiced their support for the 91 percent budget increase for the nanotechnology program. Dr. Morgan did mention, however, that he hopes the agency is putting equal amounts of funding in studying the potential toxicological properties of nanomaterials. Dr. Coull noted that, though nanotechnology is an important new technology, he believes ORD at EPA has not focused on further exploratory programs as much as they did in the past, and hopes they resume this kind of research.

4.2(d)—Perspectives on Climate Change**March 21, 2007****Hearing Volume No. 110-14***Background*

On Wednesday, March 21, 2007, the Honorable John Dingell (D-MI), Chairman of the Committee on Energy and Commerce, and the Honorable Bart Gordon (D-TX), Chairman of the Committee on Science and Technology met to discuss the state of climate change and how policy-makers should respond to the issue.

The Committees heard from the following witnesses: (1) Former Vice President Albert Gore. Mr. Gore was awarded an Oscar by the Academy of Motion Picture Arts and Sciences for his 2006 documentary film *An Inconvenient Truth*. He has been very involved in the issue of global warming since the 1970s and 1980s when he served as a Member of the House of Representatives (1977–1985) in the Committee on Science and Technology and then as U.S. Senator (1985–1993) for the State of Tennessee. He participated in the first Congressional hearings on the issue of global warming while he served on the Committee on Science and Technology. He also authored the *Earth in the Balance: Ecology and the Human Spirit* in 1992; and (2) Dr. Bjorn Lomborg, Director for the Copenhagen Consensus Center and an adjunct professor at the Copenhagen Business School. Dr. Lomborg is the author of the book *The Skeptical Environmentalist* published in 2001.

Summary of Hearing

Chairman Dingell opened the hearing by welcoming the witnesses and addressing several parliamentary inquiries from Mr. Barton. Science Committee Ranking Member Hall emphasized the connection between energy production and the fight against climate change, calling for a pro-growth, job creating move to independence from OPEC while ensuring America's global economic competitiveness. Chairman Gordon welcomed Mr. Gore and thanked him for his foresight on the climate change issue.

Mr. Gore presented a picture of hope that the U.S. could respond appropriately to the climate crisis. He explained that population increases and new technologies have accelerated our environmental damage. In response, he called for 90 percent CO₂ reductions in the U.S. by the year 2050, a tax change that transfers the tax burden on businesses from employment and production to pollution taxes, and U.S. participation in a strong global treaty.

During his discussion period, Mr. Gore explained that is possible to improve our economic productivity by addressing environmental issues. Representative Barton (R-TX) was skeptical of a number of points in Mr. Gore's argument, and Mr. Gore defended himself with evidence of scientific consensus on global warming projections. Recognizing the scale and complexity of the issue, Mr. Gore provided evidence of other nations' specific climate change mitigation efforts and offered additional suggestions for our own mitigation efforts.

Dr. Lomborg argued that our climate situation is often exaggerated, though he agreed that the U.S. needs smart solutions and a

public recognition that warming is manmade. He addressed four climate change related issues, heat deaths, sea level rise, hurricanes and malaria, and emphasized the need for an understanding of proportion and appropriate resource allocation in addressing the total problem.

During the discussion period, Dr. Lomborg addressed Rep. Barton's inquiries into the Copenhagen Consensus, an environmental summit, and specific scientific graph interpretations that color the climate change debate. Representative Inslee (D-WA) brought up the idea of moral obligation to the planet and future generations, and Dr. Lomborg agreed that we have such responsibilities, but noted that the U.S. could have done more in this respect. Dr. Lomborg also explained to Representative Hall (R-TX) the economic aspects of climate change, arguing for further R&D investment, and emphasized that the U.S. has the resources to produce meaningful change in disease mitigation, cleaner, and independent energy technologies. Many of the Members congratulated Dr. Lomborg on his courage to oppose much of the science community on many climate change issues.

4.2(e)—The National Oceanic and Atmospheric Administration (NOAA) Fiscal Year 2008 Budget Proposal

March 22, 2007

Hearing Volume No. 110-16

Background

On Tuesday, March 22, 2007 the House Subcommittee on Energy and Environment held a hearing entitled "*The National Oceanic and Atmospheric Administration (NOAA) Fiscal Year 2008 Budget Proposal*."

The President's FY 2008 budget request for the National Oceanic and Atmospheric Administration (NOAA) is \$3.96 billion, 2.7 percent below the FY 2006 appropriated funding. The budget includes a 6.5 percent increase for the National Weather Service, a three percent funding cut for the office of Oceanic and Atmospheric Research, the primary research arm of NOAA, and a 48 percent reduction for education programs and scholarships.

The Subcommittee heard from the following witnesses: (1) Vice Admiral Conrad Lautenbacher, Jr., Under Secretary of Commerce for Oceans and Atmosphere and Administrator, National Oceanic and Atmospheric Administration; and (2) Dr. Len Pietrafesa, Associate Dean, Office of External Affairs, Professor of Ocean & Atmospheric Sciences, college of Physical & Mathematical Sciences, North Carolina State University.

Summary of Hearing

Chairman Nick Lampson (D-TX) noted that the Administration's proposal again requests less funding for NOAA in 2008 than Congress appropriated in past years. The Administration's request for NOAA is \$3.96 billion, a 2.7 percent decrease from the enacted funding level.

Ranking Member Bob Inglis (R-SC) was concerned that the request falls \$96 million short of the FY06 appropriated funding level, but still recognized accomplishments at NOAA, even in a very tight budget environment.

Vice Admiral Lautenbacher supported the President's budget request. The current budget is lower than the FY 2006 budget, yet is an increase over FY 2007 and adequately provides for the missions that NOAA undertakes, such as the Tsunami Warning System, climate monitoring, and atmospheric and oceanic research. Lautenbacher also noted that NOAA is putting cost controls in place for its satellite programs and the Administration is in the final process of its communication policy to ensure the academic freedom of its employees.

Dr. Len Pietrafesa was not as optimistic about the budget request, saying that it is insufficient to fund all of the missions of the agency. He called for an increased budget for NOAA by noting the benefits of better weather forecasting and information. The impact of weather and the oceans on the economy is large, especially given the economic activity of our coastal regions. The insurance costs alone are enormous for the climatic disasters, and increased understanding of our environment helps mitigate those costs in the future. An integrated ocean monitoring system should be put into place to increase our scientific understanding and ability to predict the weather. Dr. Pietrafesa also suggested that NOAA be established as its own agency separate from the Department of Commerce.

4.2(f)—Establishing the Advanced Research Projects Agency—Energy (ARPA-E)—H.R. 364

April 26, 2007

Hearing Volume No. 110-22

Background

On Thursday, April 26, 2007, the Honorable Gabrielle Giffords (D-AZ) presiding, the Subcommittee on Energy and Environment met to receive testimony on H.R. 364, *Establishing an Advanced Research Projects Agency for Energy (ARPA-E)*. H.R. 364 follows on the recommendations of the National Academies 2005 report, *Rising Above the Gathering Storm*, which called on the Federal Government to create a new energy research agency within the Department of energy patterned after the successful Defense Advanced Research Projects Agency (DARPA) within the Department of Defense.

The Subcommittee heard from four witnesses: (1) Mr. William Bonvillian, Director, Washington Office, Massachusetts Institute of Technology; (2) Mr. John Denniston, Partner, Kleiner, Perkins, Caufield & Byers; (3) Dr. Stephen R. Forrest, Vice President for Research, University of Michigan; and (4) Dr. Richard Van Atta, Research Staff Member, Science & Technology Policy Institute.

Summary of Hearing

Acting Subcommittee Chair Giffords opened the hearing by emphasizing the need for diverse technologies to reduce dependence

on foreign sources of energy and reduce our greenhouse gas emissions.

Committee Chairman Bart Gordon (D-TN) added that the House recently passed the math and science recommendations from *Rising Above the Gathering Storm* and that the suggested NSF and NIST funding increases were coming to the floor in the following week. He stated that he hopes to be equally successful with the ARPA-E legislation, and invited the panel of witnesses to discuss the bill, especially its controversial recoupment plan.

Ranking Member Bob Inglis (R-SC) expressed concern that ARPA-E might divert funds from existing DOE energy projects, and that unlike DARPA, DOE does not have the contracting power to compel private groups to use the new technologies ARPA-E may develop.

In his testimony, Mr. John Denniston reiterated the three difficulties fossil fuels create: climate change, foreign oil dependency, and the risk that America may not be at the forefront of clean energy technology. He stated that he was optimistic about the public/private partnership that ARPA-E would provide. He sees the mission of ARPA-E as to fund results-oriented translational research for renewable energies, energy efficiency, and carbon capture and sequestration technologies. He emphasized that the agency should not research fossil fuels or nuclear power, which are older technologies and do not allow for a regulatory push or breakthrough technology. He urged the Committee to increase the proposed funding, stating that the amount outlined in H.R. 364 “dangerously deficient.”

Mr. William Bonvillian testified that there is no short-term energy solution, and that ARPA-E must develop a range of new technologies which can compete with one another. He sees ARPA-E, similar to DARPA, as an opportunity to bridge the “valley of death” between research and innovation. DARPA did this by connecting collaborative teams of university researchers with private firms. Though the development of ARPA-E, he said, would not force technologies on the private sector, it would expand the options available to it. He suggested that ARPA-E have several characteristics; it should be nonhierarchical, autonomous, free of “bureaucratic impediment,” emphasize the acceptance of failure, and, finally, be tolerant of risk-taking. He compared his model to an independent “island” with a “bridge” to leaders who would protect and encourage it.

Dr. Forrest argued that the focus of the agency should be to move innovations from university to industry to the market place. He said that ARPA-E should be separate from DOE, as the National Labs are not organized for translational, un-bureaucratic research. Because of this, he would have ARPA-E report directly to the Secretary of Energy, as opposed to any lesser advisors. The National Labs’ role in ARPA-E would, in his opinion, be to provide the agency with ideas on the challenges the agency should address. He also suggested that the employees have short-terms of service, and that the government provide the agency with a large budget to afford it with fresh talent and ideas.

Dr. Richard Van Atta explained that energy and environment are a huge national security issue. He also felt it was important to out-

line what the DARPA model is, exactly, as ARPA-E would be based on its success. He stated that DARPA is flexible, innovative, open to failure and extremely focused on one mission. He sees the Program Manager as similar to an independent entrepreneur and the programs and projects as not well-proven, but high risk and high reward. He said that though demonstrations are necessary, they must be small scaled, “proof of concepts” demonstrations so that they do not become funding traps.

During the discussion period, Mr. Inglis asked the panel why ARPA-E should not consider nuclear energy and suggested the government should focus on market place deals, rather than innovation. Mr. Denniston explained that though he is not opposed to nuclear energy government funding, ARPA-E’s mission should be solely in translational research. Mr. Forrest argued for funding research to make new technologies attractive in the market place. Mr. Bonvillian added that ARPA-E must determine how to build components to work with existing sectors, and Mr. Dennison stated that though research at ARPA-E is crucial, the government should also put a price on carbon. Mr. Van Atta pointed out that ARPA-E could open the energy for competition and innovation.

Chair Giffords mentioned that although HS-ARPA (Homeland Security Advanced Research Projects Agency) was based on the DARPA model, it was unsuccessful. She asked how this happened, and how ARPA-E can avoid a similar fate. Mr. Bonvillian responded that five factors contributed to the problems with HS-ARPA: 1) an initial leadership gap, 2) a lack of support from Homeland Security, 3) a lack of autonomous control over the budget, 4) a lack of employees with federal R&D experience, and 5) no clear, fundamental mission. By avoiding these problems, he said, ARPA-E would likely be successful.

Chair Giffords asked about ensuring the U.S.’s position at the forefront of energy technologies and plans for ARPA-E workforce development. Mr. Denniston noted that ARPA-E does not guarantee a U.S. “win” in the energy race, the country will undoubtedly be unsuccessful without it; in addition, a large energy, strong workforce is already developing. All the panelists were wary of including a “Buy American” clause. Mr. Bonvillian provided examples of the large university interest in energy development.

Chair Giffords asked the witnesses whether they supported a clause to bring profits from ARPA-E produced technologies back to the government. All of the witnesses opposed this idea, saying that the taxes on corporations that employ these technologies will far exceed any funds from recoupment.

Chair Giffords then asked the panel how to keep ARPA-E independent. Mr. Van Atta suggested that ARPA-E must demonstrate its impact and stay within budget; the Committee must create a well laid out mission. Mr. Bonvillian suggested a wholly owned government corporation model, with autonomy of staffing and budgeting.

In addition, all of the witnesses argued that the proposed budget was too small for ARPA-E’s weighty mission, but Mr. Van Atta was optimistic that as the agency proved itself, the government would increase the operating budget.

4.2(g)—Reorienting the U.S. Global Change Research Program Toward a User-driven Research Endeavor: H.R. 906

May 3, 2007

Hearing Volume No. 110-26

Background

On Thursday, May 3, 2007 the Subcommittee on Energy and Environment, Committee on Science and Technology held a hearing on H.R. 906, the *Global Climate Change Research and Data and Management Act of 2007*. Subcommittee Member Mark Udall (D-CO) and Subcommittee Ranking Member Bob Inglis (R-SC) introduced the bill to revise the current U.S. Global Change Research Program (USGCRP). The legislation would update the current Program to help the Nation better prepare for and cope with various climate-related impacts by producing information that can be used by State and local governments and by businesses to develop and implement strategies for adapting to climate change and mitigating greenhouse gas emissions.

The witnesses included: (1) Dr. Philip Mote, Office of Washington State Climatologist and Affiliate Professor, University of Washington; (2) Dr. Michael MacCracken, President, International Association of Meteorology and Atmospheric Sciences of the International Union of Geodesy and Geophysics; (3) Dr. Jack Fellows, Vice President, University Center for Atmospheric Research (UCAR); (4) Mr. Franklin Nutter, President, Reinsurance Association of America, and Member, UCAR's Board of Trustees; (5) Ms. Sarah Bittleman, Office of the Governor of Oregon, Theodore R. Kulongoski, on behalf of the Western Governors Association; and (6) Dr. James Mahoney, Environmental Consultant, and former Director, U.S. Climate Change Science Program (CCSP).

Summary of Hearing

Subcommittee Vice Chair Gabrielle Giffords (D-AZ) opened the hearing by applauding her colleagues for introducing legislation that addresses climate change. Giffords highlighted the challenges to achieving meaningful climate change solutions, and commended Mr. Udall and Mr. Inglis for working quickly and across party lines.

Mr. Udall briefly described the U.S. Global Change Research Program, noting that since the 1970s it has greatly contributed to our knowledge of the Earth's land, water, and atmospheric systems. The Program, however, needs to be updated. More global change information is needed as the Nation's population, economy, and infrastructure continue to put pressure on natural resources. He pointed out that fires, droughts, hurricanes and climate change are forceful reminders of our vulnerability to natural events. To reduce these events' high human and economic costs, decision-makers and resource managers in the government and in the private sector need better information to develop response, adaptation, and mitigation strategies. Udall explains the USGCRP is the vehicle to pro-

vide this information and needs to be expanded and translated into more user-friendly information.

Mr. Inglis also expressed the need for relevant global change information for State and local governments and businesses. He explained while the National Oceanic and Atmospheric Administration (NOAA), National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA) and the U.S. Geological Survey (USGS) have deepened our understanding of global climate change, a data management system is needed to coordinate and communicate information.

Dr. MacCracken spoke to the Program's assessments from his experience as the former Executive Director for the USGCRP. He explained the Program's novelty and success depends upon its ability to not only coordinate the activities of 10 agencies, but also several regions. MacCracken noted that while providing information to Congress to support policy development is certainly important, preparing for and adapting and responding to the impacts of climate change must start locally and regionally.

Dr. Fellows addressed the strengths and weaknesses of the Program. He explained the Program specializes in producing the sound scientific basics for policy-making, acting as a unique interagency mechanism for coordination and planning, and tying research and observational strategies to user needs. The Program has, however, been weakened by political influences and climate politics, and has been overshadowed by other priorities. According to Fellows the legislation is timely and necessary, but could be strengthened by highlighting the program's priorities and identifying a Program Director and Office.

Dr. Mahoney's testimony focused on Program management. While management is the responsibility of the executive branch, Mahoney explains Congress needs to guide the establishment and fund a management and coordination office. There needs to be a central location, most likely in OMB, to solidify the separate parts of the 13 collaborating agencies. He also noted that in developing better user-friendly resources, the Program requires better communication and education strategies, not a de-emphasis on scientific assessments. Finally Mahoney suggests avoiding duplication by coordinating reports and output with the international community.

Mr. Nutter discussed the role of global change for reinsurance, or the insurance of insurance, companies. In 2005, the total global insured catastrophe losses were \$83 billion and experts expect these losses to double every ten years. Nutter believes H.R. 906 will provide the necessary information to enhance risk assessment and lead to improved insurance markets.

Dr. Mote began his remarks by highlighting the societal demands for information about climate and what such demands mean locally. The regional and State level focus on climate change described in the legislation is valuable in connecting stakeholder needs. He recommends establishing a national program that translates high quality, modeling information into local stakeholder needs.

Ms. Bittleman testified on behalf of the Western Governor's Association and expressed the need for comprehensive user-driven information. The legislation would involve the National Governor's As-

sociation in evaluating the Program's research plan from a user perspective. Bittleman explained that decision-makers in government and the private sector need reliable information so they can plan and respond accordingly.

Members' questions focused on the structure and timeline of the Program. Witnesses explained the Director for the USGCRP needs to have sufficient authority to make decisions about and make budget decisions over the program. Witnesses also suggested sequencing the various reports throughout a four or five year period rather than requesting a ten year research plan, an annual plan, a vulnerability plan and a policy plan within the first year.

***4.2(h)—Prospects for Advanced Coal Technologies:
Efficient Energy Production, Carbon Capture and
Sequestration***

May 15, 2007

Hearing Volume No. 110-29

Background

On Tuesday, May 15, 2007, the Subcommittee on Energy and Environment of the Committee on Science and Technology held a hearing to receive testimony on the advancement of coal technologies and carbon capture and sequestration strategies which will help to reduce the emissions of greenhouse gases.

The Department of Energy has a number of ongoing research and development programs designed to demonstrate advanced technologies that reduce coal power's carbon emissions. In addition, some industry leaders also have begun to invest in advanced coal technologies. The Committee heard testimony from five witnesses who discussed current research, development, demonstration and commercial application of technologies that enable our power plants to operate more efficiently, reduce emissions, and capture carbon for long-term storage. They discussed the technological and economic challenges in limiting carbon emissions and safely managing the captured carbon on a large scale.

Witnesses included: (1) Mr. Carl O. Bauer, Director of the Department of Energy's National Energy Technology Laboratory (NETL); (2) Dr. Robert L. Finley, Director Energy and Earth Resources Center for Illinois State Geological Survey; (3) Mr. Michael Rencheck, Senior Vice President for Engineering Projects and Field Services at American Electric Power; (4) Mr. Stuart Dalton, Director of Generation, Electric Power Research Institute (EPRI); and (5) Mr. Gardiner Hill, Director of Technology in Alternative Energy Technology, BP.

Summary of Hearing

Recognizing that coal is a critical resource for meeting our nation's energy demand, witnesses at the hearing discussed strategies for managing carbon dioxide emissions. The challenges include advancing technologies that help gain combustion efficiencies from electric generating coal plants and demonstrating both carbon dioxide capture and sequestration technologies. Specifically, witnesses emphasized the need to demonstrate large-scale injection and stor-

age of CO₂ in underground geologic formations in order to monitor and verify the fate of the CO₂. Such large scale storage demonstrations would provide an understanding of the risks associated with sequestering large volumes of CO₂ and offer solutions to mitigate those risks.

Available carbon capture and sequestration technologies are currently too expensive for commercial use. Mr. Stu Dalton, Director of Generation at the Electric Power Research Institute (EPRI), testified that using today's capture, compression, transportation, and storage technologies would increase pulverized coal plant costs by 40–60 percent and Integrated Gasification Combined Cycle (IGCC) plant costs would increase by 40–50 percent. Mr. Carl Bauer explained the Department of Energy is working to address these added operational costs by developing CCS technology that can capture and store at least 90 percent of the potential CO₂ emissions from coal-fired power plants with less than a 10 percent increase in the cost of electricity. Accomplishing this goal requires the Department to develop cost-effective technology options by leveraging basic and applied research with field verification.

According to the Carbon Sequestration Atlas of the United States and Canada, Dr. Finley explained there is roughly 3,500 billion tons of storage capacity. Moreover, industry already has gained experience injecting carbon dioxide underground through Enhanced Oil Recovery (EOR). While the geologic capacity and injection techniques exist, the Nation has not assessed short-term and long-term risks of CO₂ storage in geologic reservoirs, such as leakage. According to the witnesses, the main challenges to CCS—showing CO₂ can be captured and stored in underground geologic formations with long-term stability, developing CO₂ monitoring capabilities, and gaining public and regulatory acceptance—can be addressed through large-scale demonstration projects.

Demonstration is the best method for successfully commercializing capture technology as well. Capturing carbon dioxide for sequestration is currently a very energy intensive and costly process. Witnesses explained CO₂ capture and compression could require 20–30 percent of the overall energy of the plant. They also noted that for oxyfuel combustion and IGCC plants, making the oxygen or separating the nitrogen and the oxygen from air for partial combustion is one of the biggest cost drivers or inefficiencies.

Witnesses also urged the Committee to integrate carbon capture with storage. They suggested operating and studying large-scale capture, transport and storage together will increase efficiency and operability.

Just as integrated carbon capture and sequestration systems reduce carbon dioxide emissions, employing cost-effective efficient technologies and practices can dramatically reduce energy use and consequent CO₂ emissions. Mr. Stu Dalton estimates that over the next 20 years, improvements in power plant efficiency can achieve CO₂ reductions of up to 20 percent per megawatt-hour without additional CO₂ capture.

Finally, during the hearing, witnesses emphasized that for the foreseeable future, coal will continue to be used to meet our energy needs. Therefore, if the Nation is going to reduce carbon dioxide emissions, it is essential that we develop techniques to safely cap-

ture and sequester carbon as a byproduct of coal combustion. H.R. 1933, the *Department of Energy Carbon Capture and Storage Research, Development, and Demonstration Act of 2007* introduced by Mark Udall (D-CO), is based on the recommendations in the MIT report *"The Future of Coal"* and authorizes research and development and demonstration programs to set a path that mitigates carbon dioxide emissions with continued use of coal as an energy resource.

**4.2(i)—Developing Untapped Potential: Geothermal
and Ocean Power Technologies**

May 17, 2007

Hearing Volume No. 110-32

Background

On Thursday, May 17, 2007 the Subcommittee on Energy and Environment held a legislative hearing on two bills designed to boost research and development into geothermal and ocean energy technologies.

Representative Jerry McNerney (D-CA) introduced H.R. 2304, the *Advanced Geothermal Energy Research and Development Act of 2007*. The bill would authorize \$90 million a year for fiscal years 2008–2012 for research and development (R&D) of technologies to locate and develop geothermal resources. Geothermal energy is generated by heat stored in the Earth and the hearing examined two types of geothermal sources: hydrothermal systems and Enhanced Geothermal Systems (EGS). Hydrothermal systems use steam or hot water from naturally-occurring, underground, heated, fluid-filled reservoirs to generate electricity or for direct use (e.g., heating buildings, greenhouses, or aquaculture operations). Enhanced Geothermal Systems (EGS) is not as location specific, and an injection well is drilled to a depth where temperatures are sufficiently high and a fluid is introduced to absorb the heat. The fluid is extracted through a production well, the heat is extracted to run a geothermal power plant or for some direct use application.

The hearing also examined H.R. 2313, the *Marine Renewable Energy Research and Development Act of 2007*. The legislation, introduced by Rep. Darlene Hooley (D-OR) and co-sponsored by Rep. Dana Rohrabacher (R-CA), authorizes \$50 million a year from fiscal years 2008–2012 to support R&D to produce electric power from renewable marine resources, such as ocean waves, tidal flows, ocean currents, or ocean thermal gradients.

The Subcommittee heard from the following witnesses: (1) Dr. Jefferson Tester, H.P. Meissner Professor of Chemical Engineering, Massachusetts Institute of Technology; (2) Mr. Paul A. Thomsen, Public Policy Manager, ORMAT Technologies Inc.; (3) Dr. Annette von Jouanne, Professor of Power Electronics and Energy Systems, Oregon State University; (4) Mr. Sean O'Neill, President, Ocean Renewable Energy Coalition; and (5) Mr. Nathanael Green, Senior Policy Analyst, Natural Resources Defense Council.

Summary of Hearing

Dr. Tester discussed the potential for geothermal to provide emission-free, dispatchable, baseload power in the United States. The U.S. currently has 3,000 MWe of capacity and the potential, with RD&D, to reach 100,000 MWe in 50 years. To achieve this capacity, the U.S. needs research that enhances the quantitative assessment of geothermal resources on a site-specific basis and demonstrates reservoir stimulation and drilling technologies.

Mr. Thomsen supported the geothermal legislation, stating that it would give the Administration the necessary push to develop a domestic geothermal energy supply.

Dr. Von Jouanne discussed the potential of wave energy through the use of commercial wave parks. For example, during the winter months, the Oregon coast has wave energy potentials in the range of 50–60 kilowatt per meter of crest length. She also highlighted wave research activities at Oregon State University.

Mr. O'Neill also discussed ocean energy and touched on several projects already underway in the United States. He emphasized the need for greater American competitiveness in developing renewable energy technologies.

Mr. Greene discussed the importance of incorporating environmental impacts into energy research and development. He recommended adding language to H.R. 2304 to study geothermal energy's environmental impacts, which is already included in H.R. 2313.

Much of the discussion focused on geothermal energy. Dr. Tester explained that the western United States would be the best region for geothermal energy production. He also explained that launching geothermal energy is more than a matter of economics, but also requires improving the technology at hand. Both Mr. Greene and Mr. Thomsen stressed the need for technology that improves the efficiency of renewable energy production, especially for geothermal energy. Mr. Thomsen added that technology development would have a positive impact on the economy, noting that because it is a domestic resource, jobs would stay in the United States.

4.2(j)—The Status Report on the NPOESS Weather Satellite Program

June 7, 2007

Hearing Volume No. 110–36

Background

On Thursday, June 7, 2007, the Subcommittee on Energy and Environment met to continue oversight on the unsettled National Polar-Orbiting Operational Environmental Satellite System (NPOESS). The NPOESS program was initiated as a tri-agency effort (NOAA–DOD–NASA) during the Clinton Administration in 1994. This new polar satellite series was designed to replace two separate satellite series—POES and DMSP—in an effort to obtain key weather data used in forecasting models.

Although no satellites have been acquired, it has already run into significant budget and schedule problems. The projected budg-

et expanded beyond 25 percent of the original plan (\$6.5 billion), and began a Nunn-McCurdy re-certification. This led to a restructuring of the program where many of the instruments were removed from the baseline manifest, and the total number of satellites was reduced from six to four. The current projections have the program costing \$12.5 billion over its lifetime, with the first satellite launch in 2013 and the final one in 2016. Despite these efforts there is still doubt that the abbreviated program will be delivered on the revised budget and schedule.

During the hearing the Government Accountability Office (GAO) released the latest report on this critical weather monitoring platform requested by the Subcommittee. They conclude that restructuring is well under way, and the program has made progress in establishing an effective management structure. There has not been enough progress to show that the key technical risks which have bedeviled the program are being reduced, however. VIIRS flight hardware has yet to be built, and CMIS flight hardware suffered an unexpected failure in early testing.

The witnesses for the hearing were: (1) Dr. John Marburger III, Director of the Office of Science and Technology Policy (OSTP); (2) Mr. David Powner, Director of Information Technology Management Issues at the Government Accountability Office (GAO); and (3) Brigadier General Susan Mashiko, United States Air Force (USAF), Program Executive Officer for Environmental Monitoring.

Summary of Hearing

Chairman Lampson (D-TX) opened by noting the history of the NPOESS project. He worried that under the current schedule, discontinuity in environmental data between the previous series of satellites and NPOESS may occur. Fortunately, the ground component of the program is under budget and the most pressing issues are the technical problems with the sensors. Rep. Lampson was concerned that because Brigadier General Mashiko is leaving, the program will face additional difficulties.

Ranking Member Inglis (R-SC) commended the oversight of the program, and said efforts to improve the program have paid off. He noted the technical challenges of creating one of the most complex environmental satellites ever made.

Dr. Marburger testified that the number one priority for NASA and NOAA is the continuity of terrestrial weather forecasting. Through negotiations, one of the removed sensors, OMBS-Limb, will be on the NPOESS Preparatory Project (NPP) satellite launching in 2009.

Mr. Powner discussed four risks that could undermine the project: management of a tri-agency project, a key executive leaving the project, wider staff shortages, and doubt that the cost estimate is accurate. He warned that many of the assurances and projections will be better founded once the acquisition contracts are signed and the sensors are delivered.

Brigadier General Mashiko reported that the new program baseline is finalized and a contract should be ready in July 2007. She also assured the Subcommittee that the Visible Imager Infrared Radiometer Suite (VIIRS) is close to being delivered, and the Cross-track Infrared Sounder (CrIS) has failed a vibration test but will

not pose a large risk to on time delivery. She expressed her confidence that the NPOESS is progressing on budget and schedule.

***4.2(k)—A Path Toward the Broader Use of Biofuels:
Enhancing the Federal Commitment to Research
and Development to Meet the Growing Need***

June 14, 2007

Hearing Volume No. 110–40

Background

On June 14, 2007, the Honorable Nick Lampson presiding, the Subcommittee on Energy and Environment held a hearing to examine the federal efforts on research, development and demonstration of technologies related to the production of biofuels, the development of biorefineries and demonstrations of those technologies and to identify gaps in current federal research and development programs. The hearing focused on legislative proposals to restructure and enhance the biofuels research and development programs of the Department of Energy and the Department of Agriculture under consideration in the House and Senate, including an evaluation of a “Discussion Draft” version of H.R. 2773.

There were five witnesses: (1) Dr. Thomas Foust, Biofuels Research Director, National Renewable Energy Laboratory; (2) Mr. John Berger, Chairman and CEO, Standard Renewable Energy and CEO, BioSelect; (3) Mr. Robert Dinneen, President, Renewable Fuels Association; (4) Mr. Michael J. McAdams, Executive Director, Advanced Biofuels Coalition; and (5) Mr. David Waskow, Policy Analyst, Friends of the Earth, U.S.

Summary of Hearing

Chairman Lampson (D–TX) opened the hearing by emphasizing the need for alternatives to both fossil fuels and ethanol produced from corn.

Ranking Member Inglis (R–SC) noted the benefits of biofuels’ regional diversity of feedstocks, but also that the versatility of production would make biofuel infrastructure development more difficult. He called for the aggressive development of next-generation biofuel systems.

Dr. Foust testified that the U.S. has the potential produce enough biomass to supply over 50 percent of our national fuel needs without impacting food production. While ethanol from plant biomass and hydrogenation are straightforward alternative fuel approaches, they have a limited production volume. Thus, the U.S. should work toward infrastructure and commercial viability for biomass gasification and fuels from algae.

Mr. Berger emphasized biofuels’ capacity to increase national security and create American jobs, and called for a focus on specific fuel standard goals, R&D, commercialization, and productive partnerships.

Mr. Dinneen lauded the Committee’s efforts in promoting R&D and targeted resource allocation, but foresaw some difficulties, such as how the Discussion Draft addressed the application of biofuels

in the transportation network, funding deficiencies, and a need to track the higher ethanol blend testing process.

Mr. McAdams applauded Committee efforts, but noted that the future of energy policy will require contributions from many sources. He narrated a series of slides to illustrate the state and future of biofuels, calling for sufficient flexibility for setting and reaching project goals.

Mr. Waskow stressed the importance of monitoring biofuels' environmental impacts, best accomplished through a lifecycle research and analysis approach.

During the discussion period, Chairman Lampson asked about the need for and specifics of biofuel transportation and storage infrastructure. Mr. Dinneen explained that railways would be a viable means of transportation. Mr. McAdams explained that blending biofuels with gasoline could provide cost competitive option in the near future, in part because the decentralized nature of production necessitates shorter shipping distances.

Full Committee Ranking Member Hall (R-TX) asked whether land use changes were necessary with increased biofuel production. Dr. Foust explained biofuel-related forestry replacement would need to be carbon neutral.

Ranking Member Inglis raised concerns about the coordination of multiple facilities, and Dr. Foust suggested that while national laboratories should focus on basic research, regional centers can study market factors and specific logistical issues.

Rep. Bartlett (R-MD) and Rep. Woolsey (D-CA) raised environmental concerns, citing problems with U.S. efforts in corn ethanol. Mr. Waskow agreed that setting environmental safeguards is currently a crucial and delicate task, and that a strong pace for these efforts is crucial. Furthermore, as Mr. Berger explained, the need for alternative fuels is such that imperfect solutions are still beneficial and important.

Chairman Lampson closed with inquiry about the future of pure ethanol use, and Mr. Dinnen and Mr. McAdams explained that while price and current vehicle technologies mean ethanol-fossil fuel blending will continue for the near future, fuels with 100 percent renewable content are the ultimate goal.

4.2(l)—Research, Education and Training Programs to Facilitate Adoption of Solar Energy Technologies

June 19, 2007

Hearing Volume No. 110-41

Background

On Tuesday, June 19, 2007 the Subcommittee on Energy and Environment held a hearing to receive testimony on the Discussion Draft of H.R. 2774, sponsored by Representative Gabrielle Giffords (D-AZ), which establishes several important research, education, and training programs to facilitate the adoption of solar energy technologies.

This bill addresses issues in solar research, education, and training not covered by the *Energy Policy Act of 2005*. These include a research and development program on thermal energy storage tech-

nologies for concentrating solar power, a study to determine the necessary steps to integrate concentrating solar power (CSP) plants with the regional and national electric grid, a program to ensure that a sufficient number of people are properly trained to install and maintain solar energy equipment, and the establishment of a solar energy research and information program, modeled on similar such programs for the beef and dairy industries. The program is supported by pooling funds from the private sector for the research and promotion of the solar power industry as a whole.

The Subcommittee heard from the following witnesses: (1) Mr. Herbert Hayden, Solar Technology Coordinator, Arizona Public Service (APS); (2) Mr. Rhone Resch, President, Solar Energy Industries Association (SEIA); (3) Ms. Jane Weissman, Executive Director, Interstate Renewable Energy Council (IREC), and Vice Chair of the North American Board of Certified Energy Practitioners (NABCEP); (4) Professor Joseph Sarubbi, Chair, Building Systems Technology Department at Hudson Valley Community College; and (5) Dr. David Arvizu, Director, the Department of Energy's National Renewable Energy Laboratory (NREL).

Summary of Hearing

Witnesses at this hearing agreed that thermal storage technology is critical to the viability of CSP as a significant energy option. Dr. Arvizu noted that the ability of CSP technologies to store energy presents an opportunity to produce baseload power at about five cents per kilowatt-hour. Such systems would include 13–17 hrs. of thermal storage and would compete with the cost of power from coal plants using carbon sequestration technology. It is expected that an aggressive R&D program could achieve the cost goal by 2020.

Along with Dr. Arvizu, Mr. Hayden lent his support to the CSP grid integration study as well. Intermittent renewable resources such as wind and solar present special economic challenges for transmission investment because they do not efficiently utilize the transmission investment at all times. Mr. Hayden and Dr. Arvizu also agreed that minimizing water usage is an important factor in reducing cost.

Testimony supporting a workforce training component was given by Ms. Weissman and Professor Sarubbi. Ms. Weissman said that if market past performance continues and current projections are realized, then current training opportunities fall far short of expected demand for qualified workers. She noted that DOE estimates that 5,000 trained installers could be needed by 2015 to meet the goals of its Solar America Initiative, and to date, we have only 365 certified solar electric installers and 40 certified solar thermal installers. She also noted that training needs to be based on industry standards so that students are taught the right skills with the right equipment.

Mr. Resch provided testimony on the growth opportunities for the solar industry as a whole in the United States, as well as on the need for a solar research and information program, also known as a check-off program, modeled after several similar product promotion programs for agricultural products that are funded by industry and managed in conjunction with the U.S. Department of

Agriculture. He explained that such a program would pool industry resources to increase awareness of solar energy as an option across the Nation, and ensure that consumers know what quality control standards to look for in the purchase and installation of solar energy equipment.

4.2(m)—The Department of Energy's Support for the Savannah River Ecology Laboratory (SREL), Part I

July 17, 2007

Hearing Volume No. 110-45

Background

On July 17, 2007, the Subcommittee on Energy and Environment and the Subcommittee on Investigations and Oversight held a joint hearing entitled "*The Department of Energy's Support for the Savannah River Ecology Laboratory (SREL), Part I.*" The purpose of the hearing was to examine the past and current work of the Savannah River Ecology Laboratory (SREL), its relationship to the Savannah River Site and the Communities bordering the Site, and the events leading to the Department of Energy's (DOE) decision to withdraw funding for the laboratory in fiscal year 2007.

SREL is a research laboratory owned by the University of Georgia that studies and monitors the radiological waste held at the Savannah River Site (SRS), a National Environmental Research Park (NERP). The laboratory maintains long-term records of environmental indicators and engages in other research pertaining to the effect of the pollutants held there on natural and artificial environments, including agricultural systems. This first part of a two part hearing looked into the scientific validity of the work at SREL.

The hearing heard testimony from two panels. The first panel included: (1) the Honorable John Barrow (D-GA), Representative of Georgia's 12th congressional district. The second panel included: (2) Dr. Jerry Schnoor, professor of civil and environmental engineering, University of Iowa; and (3) Dr. Ward Whicker, professor of radio-biology, Colorado State University.

Summary of Hearing

Chairman Brad Miller (D-NC) opened the hearing by decrying the actions and the threatened closure of SREL. He stressed the quality and independence of SREL's work, which was useful not only in maintaining the safety of the Savannah River Site, but has helped others understand other polluted areas. Chairman Miller accused DOE of creating a unique process to review SREL's funding, a process designed to shut it down. Chairman Lampson (D-TX) added that the lab has saved the public millions of dollars through a better understanding of the environmental challenges of this pollution.

Ranking Member Sensenbrenner (R-WI) expressed that the hearing began by accusing DOE of impropriety without anybody from DOE present to defend itself. Chairman Miller stated that extraneous events and the second hearing provides ample opportunity for fairness in this process. Rep. Sensenbrenner agreed that

SREL has done good science but thought the issue was what went wrong with the DOE in making their decisions.

Rep. Barrow testified that SREL and the surrounding NERP are crucial tools to understand out pollutants interact in the environment. The fact that the government has created these areas means that the kind of monitoring and science SREL does should be done. He further stated that a private contractor cannot provide the quality of monitoring that SREL has done.

Dr. Schnoor is independent of SREL but knowledgeable of its work. He testified that the ecological risks of pollution are better understood at SREL than anywhere else in the United States. SREL provides independent and verifiable information on the remediation of the pollutants found on the site.

Dr. Whicker testified to the importance of SREL's work, especially in clean-up risk analysis. He explained that there are thresholds in clean-up as contamination increases. Understanding the conditions where it is useful to commit to a more drastic technique requires good science, and SREL has been instrumental in this research. Furthermore, the basic research of pollutant movement and natural sequestration clarifies existing risks and characterizes new ones in environmental clean-up.

During questions, Dr. Whicker testified that a private contractor could not have done the SRS risk assessment that SREL does. Dr. Schnoor emphasized that the method for remediation at SRS, Monitored Natural Attenuation (MNA), cannot be done without long-term monitoring. Rep. Sensenbrenner asked why SREL doesn't support itself through normal peer-review grants. Dr. Schnoor responded that SREL does compete for research grants, and its specially appropriated funds are for operating and infrastructure costs, like other national laboratories.

4.2(n)—Tracking the Storm at the National Hurricane Center

July 19, 2007

Hearing Volume No. 110-47

Background

On Thursday, July 19, 2007 the Subcommittees on Energy and Environment and Investigations and Oversight met to evaluate recent events at the National Oceanic and Atmospheric Administration (NOAA) Tropical Prediction Center (TPC/NHC). Upon the orders of NOAA's Administrator, Conrad Lautenbacher, an assessment team was formed to review the operations of the tropical prediction center. In response to the Assessment Team's preliminary reports, the Vice Admiral placed Center Director X. William (Bill) Proenza on administrative leave. The hearing explored the process that culminated in Mr. Proenza's removal.

The Subcommittees heard from three witness panels. The first panel included: (1) Mr. X. William Proenza, Director, Tropical Prediction Center, National Hurricane Center, National Centers for Environmental Prediction, NOAA. The second panel included: (2) Dr. Robert Atlas, Director, Atlantic Oceanographic and Meteorological Laboratory, NOAA; and (3) Mr. Don McKinnon, Director, Jones

County (MS) Emergency Management Agency; and (4) Mr. Robie Robinson, Director, Dallas County Office of Security and Emergency Management. The third panel included: (5) Hon. Conrad Lautenbacher, Vice Admiral, U.S. Navy (Ret.), Under Secretary of Commerce, Oceans and Atmosphere and Administrator, NOAA; and (6) Dr. James Turner, Deputy Director, National Institute of Standards and Technology (NIST).

Summary of Hearing

Energy and Environment Subcommittee Chairman Lampson (D-TX) opened the hearing by saying that he did not understand why Admiral Lautenbacher believed that dispatching an assessment team with little experience or knowledge of NWS or forecasting to the Center was the appropriate way to deal with staff complaints about Mr. Proenza. It seemed that the arrival of the assessment team exacerbated problems with the staff, and has left the NHC without a Director. He stressed that the situation needs to be resolved so the NHC can continue forecasting hurricanes and issuing warnings to the emergency management community and the public.

Oversight and Investigations Subcommittee Chairman Miller (D-NC) warned against the hazards of office politics. He asked whether Mr. Proenza was removed as a result of leadership difficulties or because he was a whistleblower, particularly regarding the QuikSCAT program.

Energy and Environment Subcommittee Ranking Member Inglis (R-SC) countered that the matter at hand may be just a personnel matter and expressed approval at the hearing's mission to decipher the conflict.

Oversight and Investigations Subcommittee Ranking Member Sensenbrenner (R-WI) echoed Rep. Inglis' doubts but argued that Mr. Proenza should be excused from the panel for not having provided written testimony, while Admiral Lautenbacher should be allowed to testify before the other witnesses.

Mr. Proenza defended his actions as NHC Director, expressing his desire to return to his position.

During the first panel discussion, the Members asked Proenza about the details of the Assessment Team's investigation, the presence of public media at NHC, his recommendations for the QuikSCAT program, and the details of Mr. Proenza's employment and leadership reputation at NHC. They also discussed his opinions of past and current NHC agendas, operations, and staff.

During the second panel, Dr. Atlas detailed and emphasized the value of the QuikSCAT satellite. Mr. McKinnon provided a favorable picture of Mr. Proenza's former employment at the National Weather Service's Southern Region and expressed regret that Mr. Proenza's defense of public interests may have invited retribution. Mr. Robinson lauded Mr. Proenza's interactions with local emergency managers, his talent in leadership, and his honesty in addressing problematic issues.

During their discussion period, the witnesses all testified to both the professional skill and personal integrity of Mr. Proenza and to what the personnel problems at NHC might have been. Dr. Atlas provided Chairman Lampson and Rep. Diaz-Balart (R-FL) with his

recommendations for advancement in hurricane forecasting and Mr. Klein with an explanation of QuikSCAT alternatives.

During the third panel, Admiral Lautenbacher assured the Committee that NOAA, the National Weather Service, and the TPC were prepared for the coming hurricane season. He cited employee complaints about Mr. Proenza's leadership and relationship with the Assessment Team and defended the decision to remove him from his position as TPC Director. Dr. Turner cited low staff morale and organizational difficulties as support for Mr. Proenza's removal.

During the discussion, Admiral Lautenbacher detailed the process for assessing and removing Mr. Proenza from the NHC. He confirmed with Chairman Miller that all relevant NOAA documents had been or would soon be provided. Rep. Diaz-Balart asked Dr. Turner if, in his experience, the incidence of a staff turning against a supervisor en masse is a common occurrence, and Dr. Turner asserted that it was not.

4.2(o)—The Department of Energy's Support for the Savannah River Ecology Laboratory (SREL), Part II

August 1, 2007

Hearing Volume No. 110-50

Background

On August 1, 2007 the Subcommittee on Energy and Environment and the Subcommittee on Investigations and Oversight held a joint hearing entitled "*The Department of Energy's Support for the Savannah River Ecology Laboratory (SREL), Part II.*"

The Savannah River Ecology Laboratory was founded by University of Georgia in 1951 to monitor the environmental effects of the Savannah River Site (SRS) which is home to the much larger Savannah River National Laboratories (SRNL). It is run by the University of Georgia (UGA) and operates under agreements made with the Department of Energy (DOE).

It has regularly obtained individual and specific funding within the DOE. SREL lost this funding in Fiscal Year (FY) 2006. The Georgia and South Carolina congressional delegations met with DOE, UGA, and SREL to reverse this decision. An agreement was made in May 2005 to ease the transition by allocating \$4 million in FY06 and \$1 million FY07 and with an invitation to seek funding elsewhere. The Director of SREL then set to establish a new cooperative agreement with the SRS through its Director, Mr. Jeff Allison. This agreement funded SREL \$20 million over four years. Mr. Allison then was made aware of the previous agreement in May 2005, and was told to make his offer commensurate with this. As a result SREL lost this funding, and instead any additional funding would come pending a technical-peer review of its proposed tasks based on a mission critical need. The proposal from SREL of 27 tasks totaling about \$3 million was reduced to six tasks for \$800,000 by the judgment of DOE Project Directors. Given this and a lack of outside funds, SREL is threatened with closure.

The witnesses were convened into four panels. The first panel held: (1) Hon. Clay Sell, Deputy Secretary of Energy, U.S. Depart-

ment of Energy. The second panel held: (2) Dr. Paul Bertsch, former Director, Savannah River Ecology Laboratory, and (3) Ms. Karen Patterson, Chair of the Citizens Advisory Board (CAB), Savannah River Site. The third panel held: (4) Mr. Jeffrey M. Allison, Manager, Savannah River Operations Office; (5) Mr. Charlie Anderson, Principal Deputy Assistant Secretary, Office of Environmental Management, (6) Mr. Mark Gilbertson, Deputy Assistant Secretary, Engineering and Technology, Office of Environmental Management; and (7) Ms. Yvette T. Collazo, Assistant Manager, Closure Projects, Savannah River Operations Office. The fourth panel held (8) Dr. Raymond L. Orbach, the Director of the Office of Science, Department of Energy.

Summary of Hearing

Chairman Miller (D-NC) opened the hearing by stating that SREL's work has lead to better understanding of the SRS site and to pollution in general. It was, by any financial measure, a very inexpensive lab to operate and it would be difficult to find a better return on investment anywhere in the federal science complex.

Chairman Lampson (D-TX) questioned why Mr. Allison would negotiate a new agreement if SREL was supposed to become independent. He doubts that DOE negotiated in good faith with SREL given the documented record. Chairman Lampson said that whatever plans DOE has for SREL, they should be firm and transparent. He expressed his hope that, given SREL's exemplary track record, it would continue to be independent and adequately funded.

Ranking Member Sensenbrenner (R-WI) criticized the Chairman's bad faith in the operation of the hearing, and accused the Democrats of trying to paint the DOE in a bad light. He defended the DOE and said that they acted in good faith by fulfilling established agreements.

Ranking Member Inglis (R-SC) defended the nature of independent financing for SREL through a project by project basis. He condemned the public sector's resistance to change compared to the private sector's flexibility. Rep. Inglis suggested that DOE might be getting better research for the cost through these different methods.

Ranking Member Hall (R-TX) also recognized the good work that SREL has done. He thought that in May of 2005 it was well known that SREL would have to operate independently and with less money. He commended the efforts of Mr. Anderson and Ms. Sigal in obtaining two more years of funding. He concluded that it was Dr. Bertsch's responsibility to find suitable funding options.

Mr. Sell defended DOE by reiterating that they did not act in bad faith. DOE wanted to end special support for SREL and make it an independent UGA run lab. Mr. Sell stated that it was implicit in the 2005 agreement that non-competitive funding would end after FY07. He cited the example of SRNL which became an independently funded laboratory that has expanded and increased its budget while thriving through such funding means. He stated that SREL and UGA are responsible for the unsuccessful transition.

During the discussion, Mr. Sell emphasized that the agreement between UGA and DOE implied that SREL would become independent, and that SREL knew this by quoting a statement from

Dr. Bertsch in July 2005. Dr. Bertsch said that if federal funding ends, he would look for other funding sources. Questions also emphasized that the requirement for independence was not delineated within any of the agreements. Mr. Sell could not specify any studies assessing a closure of SREL. He could not say if the jobs terminated at SREL are now contracted out.

Dr. Bertsch, the former Director of SREL, discussed SREL's importance, such as its role for monitoring SRS's long-term waste. Dr. Bertsch explained that until May 7, 2007, he was consistently told by SRS management and program staff that SREL's work was important, that there was a need for the work, and that there was sufficient funding for the work. He also noted that in his 23 years at SREL, all contracts were developed with the SRS Site Manager and program staff and, until now, there had never been involvement from DOE-HQ of this magnitude.

Ms. Patterson testified that the Citizens Advisory Board supports SREL because it provided independent analysis of actions by the DOE at SRS. She lamented the loss of expertise, data sets, and scientific legitimacy.

During the discussion, Dr. Bertsch said that DOE had never previously asked SREL to compete for grants. He thought that with the Allison agreement, SREL would be under the Environmental Management portfolio at DOE and not Office of Science. Furthermore he wondered what exactly independence was, since he worked in DOE owned labs and buildings and studied the Savannah River Site; without DOE there is no SREL. Ms. Patterson argued that a private contractor would not carry the same legitimacy as SREL environmental analysis.

Mr. Anderson testified that DOE wanted UGA to take a lead in SREL funding, since it was going to be cut. He noted that SREL was not abruptly cut, but had two years to transition to UGA. Additionally, he claimed that competitive funding was successful since SREL won \$800,000 in DOE funding. Any blame for SREL's financial troubles should be placed on UGA.

Mr. Allison testified that despite the 2006 agreement, the previous May 2005 agreement had to be honored, leading to SREL's reduced funding. He remains hopeful about future work with SREL.

Mr. Gilbertson discussed his role in DOE to ensure that all research is done efficiently. He led the review of SREL's proposal and helped UGA guide SREL's new direction.

Ms. Collazo's did program oversight for SREL. This oversight lead to \$1.8 million total from DOE with operational costs included. She believes that DOE has met its commitments in good faith.

Questions began with Allison responding that he received no direction on what terms the cooperative agreement would be made. Mr. Allison did say that now SREL is needed for sewer and groundwater research. The "mission critical" standard to Mr. Allison meant those actions required for clean-up; Mr. Gilbertson said it is the broad discretion of the project directors. Mr. Allison responded that there was no place to submit the projects that were rejected.

Mr. Orbach affirmed DOE's Environmental Remediation Sciences Division policy that all research funds are peer-reviewed and merit

based. As this was being carried out, FY06 represented a budget crunch for Office of Science, and the specific funding for SREL was cut.

Mr. Orbach, during questions, established that SREL did not lose confidence of the Office of Science during the FY06 budget; however, given the needs of the Office of Science there was no analysis of activities done by SREL outside the Office's interests. The loss of funding was precipitated by a shift of focus away from surface ecology and to subsurface ecology. Mr. Orbach testified that this change reflects the current knowledge of subsurface transport of pollutants is lacking and could pose significant problems.

***4.2(p)—The Benefits and Challenges of Producing
Liquid Fuel From Coal: The Role for Federal Re-
search***

September 5, 2007

Hearing Volume No. 110-51

Background

On Wednesday, September 5, 2007 the Subcommittee on Energy and Environment met to discuss the use of coal to produce liquid fuel, the status of coal-to-liquid (CTL) technologies and what additional research, development and demonstration programs should be undertaken at the Department of Energy or other agencies to better understand the benefits and barriers to converting coal into transportation fuels.

There were six witnesses: (1) Dr. Robert L. Freerks, Director of Product Development, Rentech Corporation; (2) Mr. John Ward, VP, Marketing and Governmental Affairs, Headwaters, Inc.; (3) Dr. James Bartis, Sr. Policy Researcher, RAND Corporation; (4) Mr. David G. Hawkins, Director, Climate Center at the Natural Resources Defense Council; (5) Dr. Richard D. Boardman, The Secure Energy Initiative Head, Idaho National Laboratory; and (6) Dr. Joseph Romm, Center for Energy & Climate Solutions, Center for American Progress, and former Acting Assistant Secretary, Department of Energy.

Summary of Hearing

Among its benefits, the use of CTL in the transportation sector could help secure energy supplies by displacing imports of foreign sources of diesel or jet fuel. Reports also show that CTL produces tailpipe emissions that are almost completely free of sulfur, unlike conventional transportation fuels. Another benefit would be the ability to reduce carbon dioxide emissions by as much as 20 percent over the fuel cycle through the use of carbon dioxide (CO₂) capture and storage; that would be made easier because the CTL process can employ technologies which concentrate the CO₂ stream for removal.

Dr. Freerks testified on the technologies involved in coal liquefaction. He specifically discussed the Fischer-Tropsch process for producing synthetic jet and diesel fuels. With widespread implementation, CTL could displace imports of foreign fuel sources and help secure energy supplies.

Mr. Ward identified several common misconceptions about coal-to-liquids and identified opportunities for areas calling for the Federal Government's attention and increased R&D support.

Dr. Bartis noted that unconventional fuel production would provide less costly fuel to the American public. Producing large amounts of unconventional fuels, including coal derived liquid fuels, and moving towards greater energy efficiency will cause world oil prices to decrease. Their research shows that under reasonable assumptions this price reduction effort could be very large and would likely result in large benefits to U.S. consumers and large decreases in OPEC's revenues. Emissions reductions, on the other hand, may be difficult to achieve with coal-derived liquid fuels.

Dr. Hawkins argued against the claims that coal-to-liquids technology can easily reduce oil dependence and greenhouse gas emissions. Rather than mandate a fuel-specific approach or adopt incentives for a fuel-specific approach, Hawkins advocated for a fuel-neutral approach. He noted that we should have incentives and performance standards that reward entrepreneurs who deliver alternatives to oil that do the best job at backing out oil and do the best job at cutting greenhouse gas emissions.

Dr. Romm urged Congress not to promote coal as a transportation fuel, arguing that an emissions cap on carbon dioxide is a more effective approach to mitigating climate change. He agreed with Dr. Hawkins that the future of coal as a transportation fuel is with plug-in hybrids running on zero carbon, coal generated electricity.

Dr. Boardman presented a series of tables and diagrams to explain the benefits and challenges of converting coal into liquid transportation fuels. He explained that, under certain conditions, it is possible to reduce greenhouse gas emissions by up to 46 percent below comparable crude emissions.

***4.2(q)—Revisiting the Industrial Technologies
Program (ITP): Achieving Industrial Efficiency***

September 25, 2007

Hearing Volume No. 110-56

Background

On Tuesday, September 25, 2007, the Subcommittee on Energy and Environment met to discuss the Department of Energy (DOE) Industrial Technologies Programs (ITP), and prospects for improving the energy efficiency and environmental performance of the country's most energy-sensitive manufacturing processes through technological advancement and industrial process assessments. The hearing examined the successes and limitations of the Industrial Technologies Program and how the program can be improved to increase industrial energy efficiency and environmental performance in the U.S. industrial sector. It also examined areas of research that should be enhanced and explored by the ITP and the Industrial Assessment Centers, and what cost-effective opportunities would result from strengthened industrial efficiency programs.

There were four witnesses: (1) Mr. Fred Moore, Global Director, Manufacturing and Technology, Dow Chemical Company; (2) Mr. Paul Cicio, President, Industrial Energy Consumers of America; (3) Mr. Lawrence Kavanagh, Vice President, Manufacturing and Technology, American Iron and Steel Institute; and (4) Mr. Malcolm E. Verdict, Associate Director, Energy Systems Laboratory, Texas Engineering Experiment Station, Texas A&M University.

Summary of Hearing

Chairman Lampson (D-TX) opened the hearing by noting the significant decrease in the ITP's budget since 2001, pointing to their important and challenging role in increasing energy efficiency, reducing emissions and keeping costs low simultaneously.

Ranking Member Inglis (R-SC) added that industry consumes one-third of all energy used in the U.S., more than vehicles; thus, the ITP can play a major part in making industry more efficient and more cost effective.

Mr. Moore offered testimony on how to achieve greater industrial energy efficiency, citing problems of job loss and manufacturing as a shock absorber due to high and volatile fuel prices. By increasing production efficiency in various ways, Dow Chemical was able to save millions of dollars; the ITP program could help other businesses achieve the same success with a focus on energy co-generation, combined heat and power, waste heat recovery, increased funding, government-business coordination, and the EPA's Energy Star program.

Mr. Cicio explained that industry is highly supportive of increasing energy efficiency, as it helps U.S. businesses compete globally, reduce greenhouse emissions, and prevent further offshoring. He called for higher funding levels and R&D into long-term, cost effective solutions, and expressed appreciation for the Save Energy Now program.

Mr. Kavanagh argued that for the necessary reductions in greenhouse gases to occur, new processes for promoting short- and long-term energy efficiency are needed.

Mr. Verdict provided commentary on the valuable contributions of the Texas Engineering Experiment Station (TEES), some of its current limitations, and recommendations for the future.

During the discussion period, Chairman Lampson inquired about ITP efficacy in light of funding decreases, and the witnesses all suggested a return to a much higher budget. Mr. Kavanagh suggested that program management could be improved to increase the efficacy of R&D. The Members and witnesses also discussed the Dow and ITP energy efficiency savings, how to fund efficiency assessment costs, and the future of the U.S. chemical industry in light of international R&D competition and global investment. To close the hearing, Chairman Lampson agreed with Mr. Verdict that the education of engineers and innovators is a powerful and wise investment.

4.2(r)—Energy Storage Technologies: State of Development for Stationary and Vehicular Applications

October 3, 2007

Hearing Volume No. 110-61

Background

On Wednesday, October 3, 2007 the Subcommittee on Energy and Environment held a hearing to receive testimony on the state of developing competitive energy storage systems for both stationary and vehicular applications and the role for the Department of Energy's (DOE) research and development programs in supporting the development of these systems. The Subcommittee also heard testimony on the discussion draft of H.R. 3776, the *Energy Storage Technology Advancement Act of 2007*.

The Subcommittee heard from two panels. The first panel focused on stationary energy storage systems and witnesses included: (1) Ms. Patricia Hoffman, Deputy Director, Research and Development, U.S. Department of Energy Office of Electricity Delivery and Energy Reliability; (2) Mr. Brad Roberts, Chairman, Electricity Storage Association (ESA); (3) Mr. Larry Dickerman, Director, Distribution Engineering Services for American Electric Power (AEP); and (4) Mr. Tom Key, Technical Leader, Renewable and Distributed Generations, Electric Power Research Institute (EPRI). Witnesses on the second panel discussed vehicular storage systems and included: (5) Ms. Lynda Ziegler, Sr. Vice President for Customer Services, Southern California Edison; (6) Ms. Denise Gray, Director, Hybrid Energy Storage Systems, General Motors; and (7) Ms. Mary Ann Wright, Vice President and General Manager, Hybrid Systems for Johnson Controls, Director of Advanced Power Solutions, a Johnson Controls and Saft joint venture.

Summary of Hearing

Witnesses at the hearing testified that the United States presently is not a leader in the development of energy storage technologies, and industry must look to overseas companies for component parts that were oftentimes invented in the United States. It was pointed out that the success of these overseas companies is due in large part to intensive R&D and commercialization support from their respective governments, and that a similar effort is required in the U.S. The public-private partnerships stemming from the Federal Government's investment in research, development and demonstration programs will help to propel the United States into a globally competitive position. A robust domestic manufacturing base and supply chain for this advanced technology sector will also have the positive effect of creating high-wage manufacturing jobs in the U.S. By increasing the domestic capacity of this advanced technology sector, manufacturers will have greater access to necessary components for accelerating advanced storage technologies into the marketplace.

The first panel focused on stationary energy storage systems and how these technologies can be successfully integrated into the electric grid or installed alone at a residential or commercial or indus-

trial site to function as a separate power supply. The witnesses underscored the ability of storage systems to provide public benefits such as greater power reliability and security and better integration of renewable energy sources such as wind and solar into the electric grid, since energy from these sources is otherwise available only intermittently.

Ms. Hoffman, Deputy Director of Research and Development and Acting Chief Operating Officer for the Office of Electricity Delivery and Energy Reliability at the U.S. Department of Energy (DOE) testified that energy storage technologies paired with an advanced electric grid would accelerate the integration of renewable sources of energy into the grid as well as foster demand response practices where customers' appliances respond to price signals provided by electric utilities. She further discussed the benefits of energy storage for improving power quality and reliability by reducing transmission congestion and providing ancillary services such as spinning reserve services needed to meet peak electric demand.

However, Ms. Hoffman pointed out that a mere 2.5 percent of the total electric power currently delivered in the United States passes through energy storage systems and to date is largely limited to pumped hydroelectric storage. She also stated that the Department recognizes the need to continue basic research into energy storage materials and systems and during questions remarked that the demonstration programs in the bill complement the Department's activities in this area and do not duplicate its efforts.

Ms. Hoffman offered that DOE acknowledges that energy storage technologies hold much promise for the transportation sector as well. She testified that plug-in hybrid electric vehicles will help to transition the Nation away from exclusive dependence on oil for transportation fuel, and it is important to understand how such vehicles could impact the electric system.

Mr. Roberts, Chairman of the Electricity Storage Association, underscored the benefits of energy storage technology by describing the usefulness of storage systems during power outages caused by natural and manmade disasters. He recommended expanding the scope of government funding for storage programs that interact with the grid and providing adequate resources for conducting demonstrations of energy storage technologies which enhance the electric grid.

Mr. Dickerman, Director of Distribution Engineering Services at American Electric Power, agreed and emphasized the need for federal investment incentives to accelerate the widespread deployment of energy storage technologies. Mr. Dickerman also discussed his company's ongoing investment in deploying energy storage on its system using an advanced battery technology. He explained energy storage could be used to reduce peak load on equipment, provide backup energy to improve security and reliability, and enhance the use of wind generation at times of high demand.

Mr. Key, Technical Leader for Renewables and Distributed Generation at the Electric Power Research Institute, underscored the ability of energy storage technologies to support renewable energy sources that avoid emissions of harmful pollutants and to involve customers in the management of their electricity use. He also acknowledged that these technologies are expensive and siting and

permitting can be difficult. He closed by recognizing that energy storage technologies will be essential in meeting the growing demand for electricity from sources that address our environmental challenges.

The second panel focused on energy storage technologies for vehicles. Ms. Zeigler, Senior Vice President for Customer Services, Southern California Edison testified that a study conducted by the Electric Power Research Institute and the Natural Resources Defense Council found that widespread adoption of plug-in hybrids could reduce annual emissions of greenhouse gases by more than 450 million metric tons by 2050, or the equivalent of removing 82 million passenger cars from the road. Advances in electric car batteries would also help to reduce our dependence on foreign oil supplies and improve vehicle efficiencies. Electricity is the only alternative transportation fuel with a national infrastructure in place today. Consequently, plug-in hybrids could also serve as a temporary energy power supply for homes and businesses, helping customers avoid high electricity costs during times of peak demand.

Ms. Gray, Director of Hybrid Energy Storage Systems at General Motors Corporation, described the different types of battery technologies, additional research needed to develop vehicles that meet a range of consumer demands, and the difficulties of allocating limited company resources across a range of alternative technologies such as hydrogen fuel cells, advanced diesel, and flexible fuel vehicles. She traces much of the current success introducing hybrids in the U.S. auto market to public-private partnership between industry and the Department of Energy.

Mrs. Wright, Vice President and General Manager for Hybrid Systems Power Solutions, Johnson Controls spoke to the environmental benefits of plug-in electric vehicles, but cautioned that continued federal investment in technology research and demonstrations is needed to overcome significant economic barriers. In addition, investment in a national manufacturing base and infrastructure would facilitate collaboration among the stakeholders to achieve widespread deployment of these technologies in the marketplace at a price consumers can afford. Ms. Wright's written testimony includes a list of commercialization barriers and key enabling countermeasures. Among those, direct federal collaborations between battery manufacturers and other lower tier suppliers is cited as key to overcoming a range of technical challenges.

**4.2(s)—GAO's Report on the Status of NOAA's
Geostationary Weather Satellite Program**

October 23, 2007

Hearing Volume No. 110-66

Background

On Tuesday, October 23, 2007, the Subcommittee on Energy and Environment held a hearing titled *"The Government's Accountability Office's (GAO) Report on the Status of the National Oceanic and Atmospheric Administration's (NOAA) Geostationary Weather Satellite Program."* The Subcommittee met to continue oversight on the next-generation Geostationary Operational Environmental Sat-

ellite (GOES) program. The Government Accountability Office has been continuing its evaluation of progress made by the National Oceanic and Atmospheric Administration at the request of the Subcommittee, and will release their new report.

The witnesses testifying were: (1) Mr. David Powner, Information Technology Management Issues, Government Accountability Office; and (2) Ms. Mary Ellen Kicza, Assistant Administrator for Satellite and Information Services, NOAA.

Summary of Hearing

Mr. Powner discussed the findings of the GAO report. The findings revealed that NOAA has made progress in planning its GOES-R procurement—which is estimated to cost \$7 billion and scheduled to have the first satellite ready for launch in 2014—but cost and schedules are likely to grow. Specifically, the agency completed preliminary design studies of GOES-R and recently decided to separate the space and ground elements of the program into two separate development contracts. However, this change in the GOES-R acquisition strategy has delayed a decision to proceed with the acquisition. GAO informed Committee Members that it is recommending that the Secretary of Commerce take steps to ensure that the GOES-R program effectively manages and mitigates risks.

Ms. Kicza maintained that the two satellites remain on schedule and on budget. She addressed the problems that Mr. Powner brought up, including filling one of the administrative positions, as well as assuring that NOAA has the knowledge and access to NASA it needs to oversee the program. To address cost, schedule, and technical risks, the GOES-R program has established a risk management program and has taken steps to mitigate selected risks.

During the discussion, Members explored the discrepancy between the GAO and NOAA estimates. Mr. Powner argued that the GAO's estimates draw upon the history of satellite acquisitions which have a tendency to exceed estimates. NOAA has not demonstrated that it has validated NASA's contractor performance and GAO remains concerned that NOAA lacks the capability to oversee this key aspect of the program. Rep. Giffords (D-AZ) questioned whether building older models would be an efficient alternative. Ms. Kicza denied that this would be cost effective and was confident that NOAA will be able to deliver the current two satellite system on current schedule and on budget.

4.2(t)—Research to Improve Water-Use Efficiency and Conservation: Technologies and Practices

October 30, 2007

Hearing Volume No. 110-68

Background

On Tuesday, October 30, 2007, the Subcommittee on Energy and Environment of the Committee on Science and Technology held a hearing to receive testimony on H.R. 3957, the *Water-Use Efficiency and Conservation Research Act of 2007*.

The Subcommittee heard from the following witnesses present at the hearing: (1) Dr. Glen Daigger Senior Vice President, CH2M HILL World Headquarters; (2) Mr. Ron Thompson, District Manager, Washington County Water Conservancy District; (3) Mr. Ed Clerico, President for Alliance Environmental; (4) Ms. Val Little, Director, the Water Conservation Alliance of Southern Arizona (Water CASA) and Principal Research Specialist, the College of Architecture and Landscape Architecture, the University of Arizona; and (5) Mr. John A. Veil, Manager, Water Policy Program, Argonne National Laboratory.

Summary of Hearing

Chairman Nick Lampson (D-TX) opened the hearing by discussing the need for water conservation and efficiency, particularly in drought ridden areas.

Ranking Member Bob Inglis (R-SC) agreed and also called on the Environmental Protection Agency to comment on H.R. 3957.

Mr. Daigger warned that with increased population growth and urbanization, transporting clean, safe water is no longer effective or necessary. Instead, municipalities can treat reclaimed water at site with membranes, advanced oxidation and ultra-violet light. While these technologies are available now, Daigger urged Congress to support efforts to deliver these technologies more quickly and authorize demonstration programs.

Mr. Thompson discussed the importance of water conservation in the desert in Utah, which is accomplished through technology, like low-flow appliances and fixtures, and education.

Mr. Clerico testified on the importance of innovative technology for water conservation. He cited several large scale facilities where innovation and research is the key.

Ms. Little felt that the Committee should use the over 200 members of the Water-Sense Program to assist the EPA on prioritizing the area of applied research in this area. She indicated support for the Water Sense Program and Grey Water, which would increase water supplies.

Mr. Veil described ways in which produced water is currently being beneficially reused. Three main uses that he cited for produced water were increasing oil recovery, agricultural, and drinking water. He noted that produced water was not mentioned in H.R. 3957, which the Committee should consider as a possibility.

Chairman Lampson opened questioning by asking the witnesses what needs to be done to ensure U.S. leadership in water management research and development. Mr. Daigger indicated that the private sector will not receive return on this type of research investment and the government is the most likely source of funding.

Ranking Member Inglis asked whether we needed more R&D or just better implementation of current technologies. Mr. Clerico indicated that he felt there was a confidence issue with the technologies and that these technologies are employed on a widespread basis. Mr. Daigger noted the bill would influence and change water management through the bill's technology demonstration provision.

Congresswoman Giffords (D-AZ) asked the panel to talk about creative avenues that they had taken in the past with regard to water conservation. The panel cited the re-use of graywater as one

example. Mr. Thompson indicated that public acceptance of reusing graywater wasn't positive, but that education was important to change public views.

Full Committee Ranking Member Ralph Hall (R-TX) asked whether produced or non-potable reused water could be used for hydraulic fracturing and enhanced oil recovery. In response Mr. Veil explained that large volumes of water are pumped underground for this type of energy production and produced water could be used as a water source.

Congressman Jerry McNerney (D-CA) asked about customer satisfaction with graywater systems. Ms. Little indicated that households were very satisfied with the systems, with the exception of the lack of qualified installers and analysts. McNerney then asked what the incremental cost is for installing a graywater system in a new house. Mr. Clerico indicated that there was a one percent incremental cost on capital for residential buildings. Mr. Veil noted that it was very difficult to clean produced water. Mr. Daigger discussed other forms of water treatment, particle-separation membranes and reverse osmosis, mentioning that costs for those materials were decreasing with advances in technology.

Congressman Jim Matheson (D-UT) expressed that it is important that water conservation and efficiency are national issues. He then asked why per capita water use has dropped in the last eleven years. Mr. Thompson cited listed tiered pricing, restricted landscape watering, and general public education. Mr. Thompson also indicated that he saw benefits in setting up the database from the EPA to help with technology transfer.

4.2(u)—The National Oceanic and Atmospheric Administration's Fiscal Year 2009 Budget Proposal and GAO's Report on the Aviation Weather Service

February 26, 2008

Hearing Volume No. 110-78

Background

On Tuesday, February 26, 2008, the Honorable Nick Lampson presiding, the Subcommittee on Energy and Environment held a hearing to examine the National Oceanic and Atmospheric Administration (NOAA) Fiscal Year 2009 (FY09) budget proposal and the Government Accountability Office (GAO) report on the Aviation Weather Service.

The first panel had one witness: Vice Admiral Conrad Lautenbacher, Jr., Under Secretary of Commerce for Oceans and Atmosphere and Administrator at the National Oceanic and Atmospheric Administration.

The second panel had three witnesses: (1) Mr. John L. (Jack) Hayes, Assistant Administrator, National Weather Service at the National Oceanic and Atmospheric Administration; (2) Mr. Eugene D. Juba, Senior Vice President for Finance for the Air Traffic Organization with the Federal Aviation Administration; (3) Mr. David Powner, Director of Information Technology Management Issues, Government Accountability Office.

Summary of Hearing

Chairman Nick Lampson opened the hearing by expressing his support for the increase in NOAA's budget. He also expressed his concern over the recent GAO report on Aviation Weather Services.

Ranking Member Inglis expressed his support for ensuring that NOAA has any resources that it requires and concerns over issues between the Federal Aviation Administration (FAA) and National Weather Service (NWS).

On the first panel, Vice Admiral Lautenbacher provided testimony on NOAA's accomplishments including recognition by the Nobel Peace Prize Committee for work on the Intergovernmental Panel on Climate Change, geographically specific weather warnings, and the expansion of tsunami warning capabilities. He also gave testimony on where the fiscal year 2009 budget would be allocated and reasons for budget increases from fiscal year 2008.

During the first discussion period, Chairman Lampson focused on the GOES-R budget and satellites needed for the program. Vice Admiral Lautenbacher's opinion was that the projected budget was accurate, including estimates for the cost of adding two additional satellites to the program. The Chairman also asked why the NPOESS Preparatory Project was still being delayed by the VIIRS instrument. Vice Admiral Lautenbacher focused on the technical challenges and problems that have been presented by this particular project and the changes made to their timeline to allow for future problems.

Ranking Member Inglis and Vice Admiral Lautenbacher discussed the buoy systems for both the hurricane and tsunami warning systems. Lautenbacher indicated that they need supplemental buoys, better cost allocations, and maintenance and repairs for the buoys.

Rep. Wu (D-OR) and Rep. Hooley (D-OR) focused on funding promised towards tsunami education and mitigation, specifically why less than 27 percent of funding had been allocated towards it. Vice Admiral Lautenbacher said that this was the first he had heard about NOAA's failure and he would work to meet this requirement in the future. Rep. Hooley asked if NOAA would continue to help with disaster relief for the salmon runs this year and if it would be faster than in the past. Vice Admiral Lautenbacher was aware of this issue and said that he would work to help in any way possible.

In his second round of questions Chairman Lampson asked about the increase in ocean vector wind studies and contingency plans, should QuikSCAT fail. Vice Admiral Lautenbacher stressed the importance of all of these systems, mentioning negotiations with China and India and the importance of sharing information internationally. Chairman Lampson also asked about red snapper fisheries and how information from fishermen was being incorporated into their decisions. Vice Admiral Lautenbacher discussed surveys that were released in cooperation with the Gulf Fishery Management Counsel.

On the second panel, Mr. Powner testified on findings and recommendations of the GAO's report on aviation and weather services that was completed at the Subcommittee's request.

Dr. Hayes testified on the National Weather Service provision of aviation weather information to the Federal Aviation Administration.

Mr. Juba discussed the findings and the recommendations of the GAO and the value of the information provided by the NWS to the FAA.

Chairman Lampson began by questioning the relationship between the FAA and NWS, which Mr. Powner said was improving. He also asked Mr. Hayes what the FAA is doing to meet their new requirements and how they will ensure consistency of their product and services. Mr. Hayes has formed a team to address each of the requirements set before them and there is ongoing dialogue to ensure that they are met.

Ranking Member Inglis focused his questions on communication between the NWS and the FAA and on outside weather contracting done by the FAA. Mr. Hayes and Mr. Juba both acknowledged that the FAA was a major customer of the NWS, that there were other contractors that the FAA used, but none on the same scale as the NWS.

Chairman Lampson's last questions focused on supporting the Center Weather Service Units, evaluating NWS proposals, and NWS and FAA cooperation. Mr. Hayes and Mr. Juba both indicated that they were strongly committed to working together in the future.

4.2(v)—Energizing Houston: Sustainability, Technological Innovation, and Growth in the Energy Capital of the World

February 29, 2008

Hearing Volume No. 110-79

Background

On Friday, February 29, 2008, the Subcommittee on Energy and Environment held a field hearing at Rice University in Houston, TX. The Members and witnesses met to examine the new range of environmental, economic, and energy-related challenges face the United States and the rest of the world, within the context of sustainability and Houston's regional competitiveness.

Witnesses were grouped into two panels. Panel I included: (1) Mr. Bill White, Mayor of the City of Houston; (2) Mr. John Hofmeister, President of the Shell Oil Company; and (3) Mr. Thomas Standish, President of Regulated Operations, CenterPoint Energy. Panel II included (4) Dr. Walter Chapman, Director of the Energy and Environment Systems Institute, Rice University; (5) Dr. Robert Harriss, President & CEO, Houston Advanced Research Center; (6) Dr. Robert Hirsch, Senior Energy Advisor; and (7) Mr. Michael Ming, President, Research Partnership to Secure Energy for America (RPSEA).

Summary of Hearing

Both Chairman Lampson (D-TX) and Ranking Member Hall (R-TX) opened the hearing by warning that global energy supplies are increasingly unable to meet our growing demand for energy, and

stressed the need for alternative energy resources and cutting-edge technologies as the United States works towards a sustainable energy future. Ranking Member Hall also expressed his concerns over Chinese oil surveying off the coast of Florida, and stressed the importance of drilling in ANWR. Congressman Bartlett (R-MD) expressed his concern that oil supplies will peak and that he would prefer to postpone drilling in ANWR. Rep. Gene Green (D-TX), Member of the Committee on Energy and Commerce, discussed the importance of the energy industry to the local economy in Houston and reiterated calls for alternative energy resources and sustainability.

Mr. Hofmeister outlined the short-term, medium-term, and long-term energy needs in the United States and how Shell is adapting to meet those changing needs. He estimated that the U.S. would remain a petroleum based economy for the foreseeable future while making a transition towards alternative fuels.

Mayor White testified on the demand side issues of energy policy to follow Mr. Hofmeister's focus on the supply side.

Mr. Standish testified on the electric grid and its developing convergence with the internet to form a "Smart Grid."

In the discussion period, Chairman Lampson asked Mayor White how the Federal Government could better serve local and State governments to address new energy challenges. Mr. White suggested retention of programs such as the weatherization program as well as increasing flexibility on the State and local application of federal standards. The Chairman then asked Mr. Hofmeister what steps Shell was taking to make oil production cleaner and more efficient. Mr. Hofmeister replied that his company is able to show a net reduction in per-barrel emissions, primarily through more efficient energy consumption. Mr. Standish further noted that customers in Houston would see lower prices and have remote control of their energy use via Internet by January 2009.

Ranking Member Hall then asked Mr. Hofmeister about his concerns that the ultra-deep drilling provisions in the *Energy Policy Act of 2005* would be removed. Mr. Hofmeister replied that ultra-deep projects are long-term projects that take years to design, and that inconsistent support of federal policies and laws made such large projects difficult. However, Congressman Hall reassured Mr. Hofmeister that there would be no "zigzagging" in the "actual thrust" of the legislation.

Congressmen Bartlett then asked Mr. Hofmeister to elaborate on his earlier comment that the country is "balanced on the razor's edge of growing demand and tightening supply." Mr. Hofmeister answered by citing the aftermath of hurricanes Katrina and Rita, during which the Nation's oil production capacity decreased by nearly 25 percent. Congressman Green concluded the first panel by highlighting problems with the Low Income House Energy Assistance Program (LIHEAP) legislation, changes in the transmission grid and the need for technical standards in that respect. Finally, he asked Mr. Hofmeister to clarify his earlier statement that, although Shell would be producing fewer emissions per barrel, there would nonetheless be a net increase in emissions because they would be producing twice as many barrels than before.

The second panel focused on academic and research sectors. Mr. Ming and Dr. Chapman spoke about the current state of oil and gas production and the transition to alternative energy sources. Dr. Hirsch spoke chiefly about peak oil, and Dr. Harriss discussed urban sustainability and his concerns over the lack of institutional capacity to make affordable, renewable energy available to Americans.

Chairman Lampson began the second question-and-answer period by asking Dr. Chapman how Rice University was connecting innovative technologies with entrepreneurs. Dr. Chapman said that the university had a program called the “Rice Alliance” to facilitate the commercialization of such technologies.

Chairman Lampson asked Dr. Harriss how he saw the role of government research changing and what could be done to enhance that role despite increasingly limited funds. Dr. Harriss explained that creating opportunities to stimulate more radical innovation and forming partnerships would be essential, and encouraged members to pursue ARPA-E as a path to such a goal.

Rep. Bartlett explained the problems he sees in current energy policies, particularly biofuels, and asked Dr. Hirsch if he thought an aggressive conservation program would be an effective means to buy time to invest in energy alternatives. Dr. Hirsch said that there was no single answer, but that it would require a multifaceted approach, combining conservation with other approaches to securing America’s energy future.

***4.2(w)—The Department of Energy Fiscal Year 2009
Research and Development Budget Proposal***

March 5, 2008

Hearing Volume No. 110–80

Background

On Wednesday, March 5, 2008, the Energy and Environment Subcommittee held a hearing on the Department of Energy’s (DOE) fiscal year 2009 (FY 2009) budget request for research and development programs.

The Subcommittee heard from three witnesses: (1) Mr. Steve Isakowitz, Chief Financial Officer, Department of Energy; (2) Mr. Mark Gaffigan, Acting Director, Government Accountability Office, Natural Resources and Environment Team; and (3) Dr. Arthur Bienenstock, President of the American Physical Society; Professor of Physics and Special Assistant to the President for Federal Research Policy at Stanford University. Instead of Mr. Isakowitz, the Subcommittee originally planned to hear from Mr. C. H. “Bud” Albright, Under Secretary of Energy, Department of Energy, and Dr. Raymond L. Orbach, Under Secretary for Science, Department of Energy. Mr. Albright and Dr. Orbach, however, did not appear for testimony.

Summary of Hearing

Chairman Lampson (D–TX) opened by noting the energy and sustainability obstacles facing the United States today, and asserted that the Administration’s budget request for DOE was rea-

sonable. He was, however, disappointed in how few resources were committed to diversifying energy sources, increasing energy efficiency and promoting renewables, as well as in the basic research budget cuts. He was pleased with funding increases for the Geothermal Technology program, but firmly admonished the Bush Administration's repeated efforts to repeal and withhold funds allocated by Congress, including those for ARPA-E and the Industrial Technologies Program.

Ranking Member Inglis (R-SC) then moved that witnesses Mr. C.H. "Bud" Albright and Mr. Raymond L. Orbach, both Undersecretaries for the DOE, would have written testimonies included in the record. Mr. Costello objected to this inclusion, but ultimately withdrew his objection.

Mr. Isakowitz testified on behalf of the Department regarding the 2009 budget request.

In his testimony Mr. Gaffigan discussed long-term trends in DOE's energy R&D funding and key barriers to the development and deployment of advanced energy technologies.

Mr. Bienenstock addressed both the extraordinary damage done by the 2008 Omnibus bill to DOE science and the balance between DOE's basic research and technology programs in his testimony.

During the discussion, Chairman Lampson asked Mr. Isakowitz about OMB impeding the implementation of Section 999, the ultra-deep program, of the *Energy Policy Act*. Mr. Isakowitz assured him that the plans were to move forward with the program, but they did not have any timeline available. Further discussions surrounding the issue ensued, largely focusing on which aspects of the program were not being followed.

Ranking Member Inglis inquired about plans to break our dependence on oil through the use of alternative energy technologies in light of budget cuts for such technologies. Mr. Isakowitz's answer focused on the efforts in hydrogen power and the budget being allocated for them. Rep. Giffords (D-AZ) then asked why the President is not committed to spending more on solar energy. Mr. Isakowitz discussed the large industry involvement in solar technology and the various solar initiatives being put forth by DOE.

Rep. Bartlett (R-MD) asked Mr. Gaffigan about long-term energy security, seeing as our fossil fuels have a finite lifetime. Mr. Gaffigan responded by acknowledging this fact, but added that it is very difficult to switch away from them when they are the cheapest short-term option relative to alternatives and change will come slowly. Mr. Isakowitz went on to discuss how hydrogen can be important in reducing the Nation's dependency on fossil fuels.

Congressman Daniel Lipinski asked about DOE's plans to submit a reprogramming request to address the lack of funding in high energy physics to which Mr. Isakowitz said there was no plan. Dr. Bienenstock felt that this would result in a great deal of loss of capability within the United States in this field. Congressman Lipinski also asked about the DOE's direction with regards to FutureGen. Mr. Isakowitz indicated that the reasons for FutureGen's change in direction were cost growth in the program and a change in the overall marketplace.

Congresswoman Judy Biggert raised concerns over the ability of the United States to stay competitive with the rest of the world if

the DOE budget was dropping. Mr. Isakowitz acknowledged the importance of these points and that the DOE had a variety of ways that it was working to stay competitive. Rep. Biggert closed the hearing by thanking the witnesses and commending the DOE for its pursuit of a facility for rare isotope beams.

4.2(x)—Utility-Scale Solar Power: Opportunities and Obstacles

March 17, 2008

Hearing Volume No. 110-87

Background

On Monday, March 17, 2008, the Subcommittee on Energy and Environment held a hearing entitled, “*Utility-Scale Solar Power: Opportunities and Obstacles*,” at the Pima County Administration Building Hearing Room, Tucson, Arizona.

There were six witnesses: (1) Mr. Mark Mehos, Program Manager, Concentrating Solar Power Program at the National Renewable Energy Laboratory; (2) Mr. Tom Hansen, Vice President of Environmental Services, Conservation and Renewable Energy, Tucson Electric Power; (3) Ms. Kate Maracas, Vice President of Arizona operations, Abengoa Solar; (4) Ms. Valerie Rauluk, Founder and CEO, Venture Catalyst, Inc.; (5) Ms. Barbara Lockwood, Manager of Renewable Energy, Arizona Public Service; and (6) Mr. Joe Kastner, Vice President of Implementation and Operations, MMA Renewable Ventures LLC.

Summary of Hearing

Chairwoman Giffords (D-AZ) opened by discussing the importance of solar power and the reasons why the southwestern United States is an ideal location for solar power. Ranking Member Ralph Hall (R-TX), Full Committee Chairman Bart Gordon (D-TN), Congressman Harry Mitchell (D-AZ), Congressman Jim Matheson (D-UT), and Congressman Daniel Lipinski (D-IL) all offered opening statements highlighting the importance of energy both in the United States and around the world, the great opportunities provided by solar technology, the challenges preventing use on a large scale, solar tax credits, and the solar energy projects underway in Arizona.

Mr. Mehos provided an overall assessment of the available resource size for solar energy in the U.S. and an introduction to the known technologies that may take advantage of solar power on a large scale.

Mr. Hansen described a “Solar Grand Plan” to provide more than half of the U.S.’s electricity from solar power by 2050.

Ms. Maracas testified on the current state of solar thermal technology and the near- and long-term economic costs and benefits of large-scale solar power in general. Ms. Rauluk’s testimony focused on the current state of distributed and concentrating photovoltaics and provided an assessment of how the marketplace for solar energy will change over the next 10 years.

Ms. Lockwood provided the perspective of utilities on the ability for large-scale solar power to be a significant competitor in the U.S. energy sector over the next 50 years.

Finally, Mr. Kastner testified on his company's experience with installing and managing the Nellis Air Force Base solar array and ways to enable productive partnerships between government and renewable energy industries in general.

Congresswoman Giffords opened the discussion period by focusing on the Grand Solar Plan. Mr. Hansen indicated that there may be as many as 150,000 new jobs created by the plan. Mr. Kastner went on to discuss the importance of the Nevado Power energy credit contract in the Nellis Air Force Base partnership. At Congresswoman Giffords' request, Ms. Maracas and Ms. Rauluk explained some specifics on international competition in solar energy, specifically the tax credits proposed in Europe.

Ranking Member Hall followed up with a question to Ms. Rauluk on why solar energy needs assistance to be a viable source of energy, which Ms. Rauluk explained was due to the up front costs of solar energy. Mr. Mehos also added that with the tax credit, up to a gigawatt of solar power could be produced each year, but it would be too expensive to do so without the credit. Ms. Lockwood noted that Arizona is an ideal place for solar power, since it has largely unused land where environmental impacts would be minimal.

Rep. Lipinski asked about the improvements being made in photovoltaic efficiency, which Mr. Hansen and Ms. Rauluk explained in great detail how efficiencies were improving from new materials, but that cost will be the driving force in most decisions. He also asked the panel if there was any conflict or tension between distributed generation and utility scale solar power. Mr. Hansen and Ms. Lockwood felt that there weren't really any conflicts and that they could compliment each other, while Ms. Rauluk was concerned about preserving utility revenues.

Rep. Matheson asked about what innovations are necessary for solar power. Mr. Mehos described several issues, including higher temperatures on the lines, higher temperature materials, higher reflectivity materials, and better absorbing materials. Mr. Mehos also touched on areas where Congress can supplement research as well. Mr. Matheson also asked about the effect of using compressed air for storage on greenhouse gas emissions. Mr. Hansen assured him that there were other options beyond natural gas that would be greener than current systems.

Rep. Mitchell asked about land use for solar power. Mr. Hansen indicated that with higher efficiency solar panels, less land would be needed and in many cases roof space is available instead of land. Ms. Rauluk followed up by showcasing the value of distributed generation from this aspect—where you don't need large pieces of land. Ms. Lockwood also indicated to Congressman Mitchell that customers may pay a premium for "green" power.

4.2(y)—The Department of Energy's FutureGen Program

April 15, 2008

Hearing Volume No. 110-92

Background

On Tuesday, April 15, 2008, the Subcommittee on Energy and Environment held a hearing entitled "*The Department of Energy's FutureGen Program*." The purpose of the hearing was to gain a better understanding of the Department of Energy's decision to restructure its FutureGen program, the process through which the decisions to restructure were made, and to obtain information about the impacts this revised approach to the FutureGen initiative may have on carbon capture and sequestration technology development. The hearing provided an opportunity to assess the potential of this programmatic shift to provide a cost-effective and timely path for development and demonstration of carbon capture and sequestration technologies.

In early 2003, the Department of Energy announced plans for the Federal Government to build a \$1 billion pollution-free power plant known as the FutureGen Initiative. The venture was promoted as a near-zero emissions power plant intended to combine electricity and hydrogen production. On January 30, 2008 the Department of Energy announced a major restructuring of the FutureGen program. Under the new program, DOE will no longer build a small-scale clean coal power plant that can test carbon capture and sequestration (CCS) technologies and provide for the demonstration of an integrated carbon capture and sequestration system. On January 30, 2008 DOE issued a Request for Information (RFI) on its new path forward to demonstrate advanced technology for electricity production from coal with a March 3, 2008 deadline for public comments.

The Subcommittee heard from four witnesses: (1) Mr. Bud Albright, Under Secretary at the Department of Energy; (2) Mr. Paul Thompson, Senior Vice President, Energy Services, at E.On, LLC and Chairman of the FutureGen Alliance Board; (3) Mr. Ben Yamagata, Executive Director, Coal Utilization Research Council (CURC); and (4) Mr. Jeffrey N. Phillips, Program Manager, Advanced Coal Generation Electric Power Research Institute (EPRI).

Summary of Hearing

Chairman Lampson (D-TX) made an opening statement on the importance of the development of new energy technologies in the mitigation of climate change, expressing interest in the restructuring of the FutureGen program.

Ranking Member Inglis (R-SC) expressed his support for clean coal and CCS technologies, and his curiosity in the sudden DOE decision to change the FutureGen program.

Full Committee Chairman Gordon (D-TN) expressed his support of the development of new energy technologies and interest in the rationale for changing the program.

Mr. Bud Albright was the only witness on the first panel and he testified that the decision to restructure was made after cost estimates for the program rose while the market for clean coal declined.

Chairman Lampson then entered materials into the record, including a letter from the Department counsel stating that they were withholding materials on the grounds of executive prerogative.

Chairman Lampson then began the discussion by asking about the use of constant dollars to compare future costs. Mr. Albright agreed with the Chairman that much of the appearance of increased costs was attributable to inflation. Chairman Lampson suggested that the Department was falsely representing the costs by switching between real and deflated dollars, to which Mr. Albright responded that no misrepresentation had occurred, but that there had been some change in the costs beyond mere inflation.

Ranking Member Inglis then asked about the effect of the restructuring on research. Mr. Albright answered that there would be some scaling back of research, but that the future research would be more focused on carbon sequestration.

Chairman Gordon then reiterated Chairman Lampson's request to receive the withheld documents as quickly as possible. He then asked about the process of evaluating projects. Mr. Albright explained that there was a timeline for the process in which they receive public comments about these decisions. He did not want to promise to share the plans for other evaluations, but agreed to plan to share the plan at some point in the future with cost estimates.

Rep. Lipinski (D-IL) asked about international funding for the project, to which Mr. Albright answered that there were many international agreements, including funds received from India and Japan, but that there were problems with intellectual property rights that prevented further international cooperation. Chairman Lampson asked when the staff was told to stop seeking international partners, to which Mr. Albright answered that he was not sure exactly how this was handled, but knew that they stopped soliciting around the end of December 2007. He later stated that the decision to cut the program was made by the Secretary sometime between December and January of the next year, when it was clear that there would not be a financial agreement.

Rep. Costello (D-IL) continued questioning on the basis of the decision, asking about the debt financing concerns. Mr. Albright answered that the Alliance agreed to share project costs at 74/26, using debt against the taxpayers to finance their portion, which was an unacceptable solution to the Department.

The second panel began with Mr. Thompson who expressed his disappointment in the collapse of this project. Mr. Yamagata then stated that the program was very important but extremely expensive, and that both long- and short-term projects needed to be considered. Mr. Phillips testified that FutureGen was an important project, but only one piece of what was needed to solve the problem.

Chairman Lampson began the question period by focusing on the 90 percent reduction requirement, and the panel's conflicting views on the matter. Mr. Yamagata responded that FutureGen will

achieve this reduction; it will simply be very expensive to do. Instead, a slower progression of carbon capture was needed in the short-run. Mr. Thompson agreed that 90 percent was an appropriate and achievable long-term goal, but not optimal yet.

Rep. Costello asked about the 26/74 cost share, presenting a letter than stated the Alliance would be willing to increase its investment to 50 percent. Mr. Thompson responded that they would be willing to renegotiate.

**4.2(z)—The National Sea Grant College Program Act:
H.R. 5618**

May 21, 2008

Hearing Volume No. 110-103

Background

On Wednesday, May 21, 2008 the Subcommittee on Energy and Environment held a hearing to receive testimony on H.R. 5618, the *National Sea Grant College Program Amendments Act of 2008*. H.R. 5618, introduced by Representative Bordallo (D-GU), Chair of the Committee on Natural Resources Subcommittee on Fisheries, Wildlife, and Oceans, reauthorizes and amends the *National Sea Grant College Program Act*.

The National Sea Grant College Program (Sea Grant) was established in 1966 by the *National Sea Grant College Program Act* (33 U.S.C. § 1121–1131) and was last reauthorized in 2002. The Sea Grant Program is intended to be the marine, coastal, and Great Lakes counterpart to the Land Grant College system, which serves the agricultural research and extension needs of each state. Each of the 32 Sea Grant programs works with the National Sea Grant office in the National Oceanic and Atmospheric Administration (NOAA) and the coastal community in their state or territory to develop research priorities to promote sustainable use and management of coastal or Great Lakes resources. The Sea Grant program is supported through a combination of federal appropriations, State appropriations and in-kind contributions.

The Subcommittee heard from the following four witnesses: 1) Mr. Paul Anderson, President, Sea Grant Association and Director, Maine Sea Grant College Program; 2) Mr. Patrick Riley, General Manager of Western Seafood, Freeport, TX; 3) Mr. Craig McLean, Deputy Assistant Administrator for Programs & Administration, Office of Oceanic and Atmospheric Research (OAR), National Oceanic and Atmospheric Administration (NOAA); and 4) Mr. M. Richard DeVoe, Executive Director, South Carolina Sea Grant Consortium.

Summary of Hearing

Mr. McLean testified that the reauthorization bill strengthens the program by increasing the non-match funding. Mr. Anderson testified that the funding levels in the bills do not keep pace with the growing demands for the Sea Grant. Mr. DeVoe echoed the previous testimonies by saying that the current authorization bill would underfund the program, curtailing its ability to provide much-needed services. Mr. Riley testified that the research of the

Sea Grant has produced numerous innovations to improve economic efficiency while reducing environmental damage in the fishing industry.

Chairman Lampson (D-TX) began the discussion period by asking the panel to comment on expanding Sea Grant's mandate to national and regional issues. Mr. McLean answered that the grant had been very successful in its previous work, and would be best suited to deal with these larger-scale issues that don't fit in geopolitical boundaries. Mr. Anderson responded that the regional approach has been used for some time and has thus far been very successful. Mr. DeVoe agreed that a larger-scale approach was necessary for many of these issues, but that land use decisions are largely made at the local level, necessitating a local-level approach.

Ranking Member Inglis (R-SC) asked about aquaculture research, to which Mr. DeVoe responded that in South Carolina, there has been some research on sustainable aquaculture. He also stated that stormwater runoff is an extremely important issue in South Carolina, and it is currently being addressed by Sea Grant. Ranking Member Inglis then asked if any research has been devoted to offshore windfarms. Mr. Anderson responded that Sea Grant involvement varied by region, but the east coast region was heavily involved in wind production. Mr. Inglis commented that one of the greatest barriers to offshore wind production is the transmission. Mr. McLean responded that this is not an area of active research by the Sea grant, but that wave-generated power is being assessed.

Rep. Bartlett (R-MD) asked whether the Sea Grant colleges would have the same approach to conservation that land grant colleges have previously taken. Mr. DeVoe commented that the conservation ethic has always been part of Sea Grant; it is simply a public perception that the oceans have changed over the years. Mr. Bartlett then highlighted a case of septic treatment on farmland, asking if Sea Grant was doing anything to address the problem. Mr. McLean commented that this was an excellent example of a case where community involvement was necessary, and would be well-handled by the Sea Grant.

4.2(aa)—The Federal Ocean Acidification Research and Monitoring Act: H.R. 4174

June 5, 2008

Hearing Volume No. 110-106

Background

On Thursday, June 5, 2008 the Subcommittee on Energy and Environment held a hearing on H.R. 4174, the *Federal Ocean Acidification Research and Monitoring Act*. The purpose of the hearing was to receive testimony on H.R. 4174, legislation introduced by Rep. Tom Allen (D-ME). The Committee also examined the current status of science on ocean acidification and research and monitoring activities focused on ocean acidification and its potential impacts on marine organisms and marine ecosystems.

Ocean acidification is the process by which the pH of seawater is being lowered through the absorption of carbon dioxide (CO₂)

from the atmosphere. Atmospheric concentrations of CO₂ have increased over the past 200 years from a pre-industrial level of about 280 parts per million to 379 parts per million in 2005. The concentration of CO₂ in the atmosphere would be much higher if not for the absorption of CO₂ by the oceans. The oceans have absorbed about 50 percent of the carbon dioxide (CO₂) released over the past 200 years due to human activities resulting in chemical reactions that release carbonic acid and lower ocean pH. The Royal Society of London released a report in 2005 of the consequences of ocean acidification and indicated that the increase in acidity could be as high as 30 percent over the last 200 years. H.R. 4174 is intended to provide a statutory structure to ensure ongoing coordination of the relevant agencies to develop a comprehensive federal research, monitoring and assessment program to address the impacts of ocean acidification.

There were six witnesses: (1) the Honorable Jay Inslee (D-WA); (2) Dr. Richard A. Feely, Supervisory Chemical Oceanographer, Pacific Marine Environmental Laboratory, National Oceanic and Atmospheric Administration; (3) Dr. Joan Kleypas, Scientist, Institute for the Study of Society and Environment, National Center for Atmospheric Research; (4) Dr. Scott Doney, Senior Scientist, Department of Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution; (5) Dr. Ken Caldeira, Scientist, Department of Global Ecology, Carnegie Institution for Science of Washington; and (6) Mr. Brad Warren, Director, Productive Oceans Partnership Program, Sustainable Fisheries Partnership.

Summary of Hearing

The first panel consisted of the Honorable Jay Inslee (D-WA). His statement addressed the threat of acidification and the importance of this bill. Rep. Akin (R-MO) asked several questions about the chemistry involved in this process, which Rep. Inslee deflected to scientists on the following panel. Other Members of the Committee praised Mr. Inslee for his efforts on this topic.

The second panel began with a statement by Dr. Feely, who spoke in support of the bill and further research on this topic. Ms. Kleypas discussed the effect of acidification on skeletons and shells, killing those organisms which then serve as the basis of the marine ecosystems. Mr. Doney echoed the previous statements, discussing how the degradation of calcium carbonate destroys corals and other vital organisms which serve as the basis of the ecosystem. Dr. Caldeira discussed the need for further research to explore the scope of this problem, calling for more funding than provided in the bill. Mr. Warren spoke about depletion of fish stocks and the need for more information in order to sustainably manage these resources.

Chairman Lampson began the question period by asking which agency should take responsibility for developing a plan for the program developed in the bill. Dr. Doney responded that the Global Change Research Program was overwhelmed, and therefore the National Science and Technology Council's (NSTC) Joint Subcommittee on Ocean Science and Technology (JSOST) would be a better option.

Ranking Member Inglis (R–SC) then asked the panel if there were any problems with the bill. Mr. Doney responded that NOAA receives all of the money and leadership, even though the expertise is more broadly spread across agencies. Dr. Feely answered that both NOAA and the JSOST subcommittee were very comfortable with their leadership positions. Dr. Caldeira responded that there were many people in leadership positions at agencies that were unaware of the capabilities in this issue, and that they should talk with the field scientists working on the topic.

Rep. McNerney (D–CA) asked about model sophistication, to which Dr. Caldeira responded that open oceans are very simple models, but models of coastal environments are still being developed. Dr. Doney responded that there was a need for more interaction between basic science and modeling to create the specific models needed by resource managers. Rep. McNerney then turned to Dr. Kleyvas to discuss the effects of acidification on organisms. She responded that increasing acidification not only erodes the calcium carbonate, but also makes it increasingly difficult to secrete new calcium. She explained that the only method for remediation is to reduce atmospheric carbon concentrations.

4.2(bb)—Hybrid Technologies for Medium- to Heavy-Duty Commercial Trucks

June 10, 2008

Hearing Volume No. 110–107

Background

On Tuesday, June 10, 2008, the Subcommittee on Energy and Environment held a hearing to discuss the state of development of hybrid technologies for medium- and heavy-duty commercial trucks, as well as the role of the Department of Energy (DOE) in supporting research and development of these systems. The Members and witnesses examined the potential for energy savings and emissions reductions, the means to efficient and economically viable implementation of hybrid technologies, the major barriers in deploying these technologies, and their experiences with federal energy research programs. The Subcommittee also received testimony on a discussion draft of legislation to be introduced by Rep. Sensenbrenner.

The Subcommittee heard from the following witnesses: (1) Mr. Terry Penney, Technology Manager, Advanced Vehicle and Fuel Technologies at the National Renewable Energy Laboratory (NREL); (2) Mr. Eric Smith, Chief Engineer of Hybrid Medium Duty Trucks at Eaton Corporation; (3) Mr. Joseph Dalum, Vice President of Dueco Inc.; (4) Ms. Jill Egbert, Manager of Clean Air Transportation at Pacific Gas and Electric Company (PG&E); and (5) Mr. Richard Parish, Senior Program Manager with Calstart Hybrid Truck Users Forum (HTUF).

Summary of Hearing

In his opening statement, Chairman Lampson (D–TX) pointed to the sizable benefits to be earned from hybrid technology use. He explained that medium- to heavy-duty trucks present a sizable op-

portunity for fuel efficiency improvement and called for federal research and development programs to that end.

Ranking Member Inglis (R-SC) then explained that the benefits of an alternative to oil are obvious, especially in light of recent oil prices. He expressed interest in whether oil prices alone provide sufficient incentive for heavy truck companies to invest in new technologies, or if the Federal Government would need to assist.

Rep. Sensenbrenner (R-WI) asserted that policy must incorporate an economy-driven approach to reducing emissions and curb climate change, not just assign new taxes. He warned against crippling our economic development in the move toward green transportation, arguing not to further burden individual truck and trucking companies already strained by high fuel costs, but to provide incentives to translate existing, small car hybrid technologies for use in the larger vehicles. Noting that heavy trucks constantly stop and go, Rep. Sensenbrenner explained that they are particularly suitable for hybrid engines. He warned of fuel-related crises in Europe, and reiterated the value of technological progress in avoiding a similar fate ourselves.

Mr. Penney called for purchase incentives and increased R&D to promote hybrid vehicles, as well as a better understanding of a heavy truck's unique duty cycle and an overall systems approach to their development.

Mr. Smith detailed Eaton's current hybrid power system, noting that all current research and development with Eaton occurs in the United States. He explained that while heavy vehicle hybrids pose a unique challenge, U.S.-based companies are poised to become the world leader in this field if research efforts are strong.

Mr. Dalum focused on his company's development of a plug-in hybrid medium-duty truck, noting technical hurdles but predicting that a heavy-duty truck will eventually run on 100 percent electricity over limited driving ranges.

Ms. Egbert explained PG&E's success with hybrid trucks, particularly with "trouble" or "bucket" trucks, but warned of the current 50 percent upfront cost differential between hybrid and traditional models and called for a government-issued financial incentive.

Mr. Parish emphasized the crucial differences between heavy-duty trucks and light-duty ones, and suggested a five- to ten-year government support program for technology implementation.

During the discussion period, the Members asked for information on how to make large truck hybrid technology economically viable, exploring DOE's level of involvement and what would account for sale prices. Mr. Parish explained that companies wish to comply with emissions regulations, but do not have adequate funding for large truck R&D, as their light-load hybrids are still a fledgling project. Mr. Smith noted that the vertically-integrated passenger car industry promoted design responsibility and easier integration of hybrid technologies, but the horizontally-integrated heavy vehicle market demands technology that can join existing systems produced by several different manufacturers. He also explained that the higher prices for hybrids are a result of all the additional components their construction requires.

Chairman Lampson asked whether the 21st Century Truck program had been successful, and Mr. Parish responded that it had limited success, in part due to leadership and motivation problems.

Ranking Member Inglis asked whether the difficulties were mostly science or economics based. Mr. Dalum attested that it was a bit of both, noting specific challenges of hybrid technology itself, as well as cost barriers to their development and distribution. This led to a discussion of the current battery technology, such as lifespan and thermal management. Mr. Parish concluded that the crucial element to economical, efficient product design is a whole systems approach.

The final portion of the discussion was on how the government should allocate money to promote efficient product development. Rep. Sensenbrenner argued that competitive grants for research were the most useful, and not government regulation or taxes. Ranking Member Inglis responded that grants call for a large amount of money and productive energy, and that tax credits are the more efficient way to deliver a stimulus; moreover, he wished to internalize the negative externalities of our traditional technologies—that is, to punish polluters. Mr. Parish argued that government funding should be allocated through a three-pronged approach: research and development, demonstration programs, and rebates or tax incentives that ensure monetary savings ultimately come down, in part, to the final consumer. The witnesses agreed that the efforts of universities and national labs combined with private engineering companies would be the most successful operating as an open-information consortium, each looking at different elements of the whole issue.

4.2(cc)—An Insecure Forecast for Continuity of Climate and Weather Data: The NPOESS Weather Satellite Program

June 19, 2008

Hearing Volume No. 110–109

Background

On Thursday, June 19, 2008, the Subcommittee on Energy and Environment met to discuss the birth of the National Polar-Orbiting Operational Environmental Satellite System (NPOESS), a next-generation information agency to be used for military operations and monitoring weather. The Members and witnesses considered budget concerns, operations efficiency and specific progress on select technologies.

There were two witnesses: (1) Mr. David Powner, Director of Information Technology Management Issues in the Government Accountability Office, and (2) Vice Admiral Conrad Lautenbacher, Administrator of the National Oceanic and Atmospheric Administration.

Summary of Hearing

In his opening statement, Chairman Lampson (D–TX) noted that the NPOESS has had a difficult birth, plagued by instability, technical problems, time delays, and rising costs. Ranking Member Ing-

lis (R-SC) added that the last year has been particularly unstable and expensive, leading to threats of funding withdrawal from the Departments of Defense and Commerce. He called for more efficient use of taxpayer money and a timely success of this crucial program.

Witness David Powner discussed continued concerns about NPOESS restructuring, key risk areas for the program and their potential impact, and the need for a long-term strategy for program sensor restoration. He noted difficulties with interagency coordination (as the Departments of Defense and Commerce and NASA are all involved in NPOESS), and identified technical sensors, security, and uncertainty of costs as NPOESS' biggest risks. Mr. Powner explained that NPOESS needs to finalize acquisition documents, revise cost estimates and address long-term continuity of climate and space observations in general.

Vice Admiral Lautenbacher updated the Members on the NPOESS' reaction to the Government Accountability Office (GAO) concerns about the program. He relayed specifics of individual instrument progress, expressing particular concern about past contractor performance and technical issues of the Visible/Infrared Imager/Radiometer Suite (VIIRS), but was confident in VIIRS' current progress. He also addressed budget concerns, estimating the program would need for \$1 billion in additional funds beginning in 2017. Lautenbacher chided the DOD's threats to remove funding, calling it a lack of commitment to the program.

The question and answer period focused on problems with budget and bureaucratic inefficiency. In particular, Members were dissatisfied with NPOESS' Executive Committee (EXCOM) and their failures to conduct transparent operations, cooperate among themselves, and ensure the approval of key documents by the DOD. Vice Admiral Lautenbacher claimed that EXCOM activity has improved since the prior Nunn-McCurdy review, citing agency-head attention to detail and personal involvement. The witnesses agreed that performance of VIIRS is the program's biggest problem, but that the DOD threat to withhold funds was a close second. However, they decided that NPOESS still deserves a "green light," provided it can meet some key deadlines.

Chairman Lampson asked about the particular challenges to tri-agency coordination, and Vice Admiral Lautenbacher noted a problem with defining the DOD's authority of the acquisition executive. He was moderately confident in the NPOESS' current progress in general, but Mr. Powner called it "bureaucracy as its worst." Rep. Inglis pointed out that the DOD is threatening to withhold funding, but that it is also a part of the problem with document delays; he and Mr. Powner expressed concern that the DOD has its wires crossed on NPOESS communications in general.

Rep. Bartlett (R-MD) suggested that the general bureaucratic delays could be attributed to three issues: incompetence, too much work to do, or not enough work to do. The witnesses agreed that NPOESS was most plagued by the second problem. The hearing closed with a discussion of program cost estimates, allowing a possible \$1.2 to \$1.8 billion increase in life cycle funding.

4.2(dd)—The State of Hurricane Research and H.R. 2407, the National Hurricane Research Initiative Act of 2007

June 26, 2008

Hearing Volume No. 110–112

Background

On Thursday June 26, 2008, the Honorable Nick Lampson presiding, the Subcommittee on Energy and Environment and the Subcommittee on Research and Science Education held a joint hearing to examine the Nation's hurricane research and development priorities, and to receive testimony on H.R. 2407, the *National Hurricane Research Initiative Act of 2007*, introduced by Representative Hastings (D–FL), which establishes a National Hurricane Research Initiative to improve hurricane preparedness.

There were two witness panels. The first panel included: 1) Rep. Alcee Hastings (D–FL) and 2) Rep. Ileana Ros-Lehtinen (R–FL). The second panel had five witnesses: 1) Dr. John L. “Jack” Hayes, Assistant Administrator for Weather Services and Director, National Weather Service, National Oceanic and Atmospheric Administration (NOAA); 2) Dr. Kelvin K. Droegemeier, former Co-Chair, National Science Board Task Force on Hurricane Science and Engineering; 3) Dr. Shuyi Chen, Professor of Meteorology and Physical Oceanography, University of Miami, Rosenstiel School of Marine & Atmospheric Sciences; 4) Dr. David O. Prevat, Assistant Professor, Department of Civil and Coastal Engineering, University of Florida; and 5) Dr. Stephen P. Leatherman, Director, International Hurricane Research Center, Florida International University.

Summary of Hearing

Chairman Lampson opened the hearing with a brief statement discussing the importance of the issue, citing the grave effects of such natural disasters, and the need to improve our forecasting and warning capabilities in order to save lives and mitigate property loss. Ranking Member Inglis, Chairman Baird, and Ranking Member Ehlers followed with opening statements echoing Chairman Lampson's remarks.

The first witness panel included Rep. Alcee Hastings (D–FL) and Rep. Ros-Lehtinen (R–FL). They both offered statements in support of H.R. 2407, and briefly outlined the current hurricane research being done in Florida. Following a brief recess, the hearing proceeded to the second panel.

Witnesses agreed on the need to implement a national coordinated hurricane initiative. Dr. Hayes testified that NOAA agrees with the overall goal of the bill, and supports a committee co-chaired by NSF and NOAA to oversee and coordinate federally-funded research efforts. He also described the Hurricane Forecasting Improvement Project, or HFIP, that was recently developed by NOAA and addresses many of the items outlined in the bill language. Dr. Droegemeier highlighted the vulnerability of the energy infrastructure in the Gulf of Mexico and reiterated the urgency for further hurricane research. Dr. Chen emphasized the importance of

universities in supplying the basic research and resources for developing an integrated forecasting system. Dr. Prevatt addressed the changes in infrastructure needed in order to mitigate the effects of winds and storm surges associated with hurricanes. He advocated for more research specifically addressing the infrastructural challenges that hurricanes present in order to minimize economic losses and reduce damage. Dr. Leatherman concluded the opening statements by summarizing the key research developments at the National Hurricane Center that address the many hazards associated with hurricanes, including storm-surge modeling, wind-engineering research and quantitative evacuation modeling.

During the discussion period, Chairman Lampson questioned the witnesses as to some of the challenges hindering better hurricane forecasting. Dr. Hayes cited the need for better observations to facilitate greater scientific understanding of hurricanes. Also, he expressed the need for funding that targets the transition of university research to operational status for the public. Congressman Baird asked the witnesses to prioritize their requested areas of funding. Dr. Hayes urged for more operational high-performance computing while Dr. Droegemeier emphasized the social aspect of hurricane forecasting, citing better communication with the public in eliciting an appropriate response. Dr. Prevatt and Dr. Leatherman both stressed the importance of developing a strong infrastructure and investing in research to better understand structural interactions with wind and water surges. Dr. Ehlers discussed with Dr. Prevatt and Dr. Leatherman the challenges that hinder changing building codes so as to make buildings more resistant to the hazards of hurricanes. Dr. Hayes concluded the hearing by answering Rep. Bartlett's questions about the dynamics of hurricanes, specifically the forces that drive intensity changes.

4.2(ee)—Harmful Algal Blooms: The Challenges on the Nation's Coastlines

July 10, 2008

Hearing Volume No. 110-113

Background

On Thursday, July 10, 2008, the Honorable Nick Lampson presiding, the Subcommittee on Energy and Environment held a hearing to examine the challenges harmful algal blooms and red tide events impose on the coastlines and in marine and fresh waters. The hearing also examined the current research on the microbial bloom ecology as well as the options for prevention, control, and mitigation. In addition, the hearing examined the state of the science and recent trends on an international level as it relates to national and global changes. The hearing examined the National Plan for Algal Toxins and Harmful Algal Blooms (HABs), and how the plan would affect our nation's ability to control the HABs problem.

The Subcommittee heard from two witness panels. The first panel included: (1) the Honorable Connie Mack (R-FL); and (2) the Honorable Allen Boyd (D-FL). The second panel included: (3) Dr.

Robert Magnien, Director of the Center for Sponsored Coastal Ocean Research at NOAA; (4) Dr. Donald Anderson, Senior Scientist and Director of the Coastal Ocean Institute at Woods Hole Oceanographic Institution; (5) Mr. Dan Ayres, Coastal Shellfish Manager and Lead Biologist at the Washington State Department of Fish and Wildlife Region Six Office; and (6) Dr. H Kenneth Hudnell, Vice President and Director of Science at SolarBee Inc.

Summary of Hearing

Chairman Lampson (D-TX) opened the hearing by discussing how harmful algal blooms can be a great threat to many coastline residents. The blooms cause a tremendous amount of damage through the production of toxins and by reducing oxygen in water.

Rep. Mack discussed the major provisions of his bill, which directs funds to scientists to study the effects of harmful algal blooms. Rep. Boyd added that when an outbreak occurs, it essentially renders the coastline worthless.

Dr. Magnien discussed NOAA's national approach to combating harmful algae blooms. The approach includes a satellite-based warning system that notifies local managers if red tide progresses, as well as forecasts future events.

Dr. Anderson discussed the nature of HABs and how they affect different parts of the United States. Research funding through the multi-agency Ecology and Oceanography of Harmful Algal Blooms (ECOHAB) program has provided scientists with the tools to combat these problems.

Mr. Ayres spoke of the negative effects HABs can have on fish and shellfish. He discussed the strengthening of the HARNNESS plan by bringing together federal and academic scientists as well as State-level managers.

Dr. Hudnell testified that human activity is allowing for HABs to thrive. He cited dropping water flow rates as one of the main factors that exacerbate HABs. He urged the Committee to develop and advance a national freshwater HAB research bill.

During the discussion period, Dr. Anderson discussed research gaps, especially the lack of instruments that effectively detect HABs and their toxins. Satellite imagery, for example, is an effective tool to detect HABs. Dr. Hudnell urged the Members to address the causes of HABs and prevent those conditions from occurring. Mr. Ayres added that continued data adding and federal funding contribute to aid efforts to deal with HABs. When asked about the effect of climate change on HABs, Dr. Hudnell testified that it does have an impact, noting that HABs are now occurring in more northern areas. He also warned that in freshwater areas, normal filtration mechanisms do not filter out all harmful toxins.

**4.2(ff)—A National Water Initiative: Coordinating
and Improving Federal Research on Water**

July 23, 2008

Hearing Volume No. 110–116

Background

On Wednesday, July 23, 2008, the Honorable Nick Lampson presiding, the Subcommittee Energy and Environment held a hearing to receive testimony on the opportunities for the Federal Government to support and better coordinate research and technological innovation to enhance water supplies and water quality and to support improved water management. The Subcommittee discussed a draft of legislation to be introduced by Chairman Bart Gordon entitled, The National Water Research and Development Initiative Act.

The Subcommittee heard from six witnesses: (1) Dr. Mark A. Shannon, Director of the United States Strategic Water Initiative; (2) Mr. Tod Christenson, Director of the Beverage Industry Environmental Roundtable (BIER); (3) Dr. Timothy T. Loftus, Water Resource Planner for the Chicago Metropolitan Agency for Planning (CMAP); (4) Mr. Jerry Johnson, General Manager at the DC Water and Sewer Authority; (5) Mr. Bradley H. Spooner, Principal Engineer for Environmental Services at Municipal Electric Authority of Georgia; and (6) Dr. Upton Hatch, Associate Director at the Water Resources Research Institute, the University of North Carolina.

Summary of Hearing

Chairman Lampson (D-TX) began the hearing by conveying the rationale behind the draft *National Water Research and Development Initiative Act*, proposed to meet the country's water challenges over the coming decades. He emphasized the need to improve data collection and availability, and the need to support connections and coordination between all levels of government in order to make the most of federal research dollars. This would be accomplished by strengthening an interagency committee currently under jurisdiction of the Office of Science and Technology Policy.

Ranking Member Inglis (R-SC) followed with remarks cautioning that future pieces of water legislation passed by Congress need to be more integrated with one another as opposed to the ad-hoc legislation of the past.

Dr. Shannon explained that if the Nation is going to meet the coming water shortages, there must be an effort to link basic research on water with practical applications for water conservation. He listed several specific areas that require additional research.

Mr. Christenson made three recommendations: that there is a need to evaluate the country's aging water infrastructure; that awareness and education should be employed to improve the practices of the general public and industries; and that in planning for the country's future, the Federal Government should not ignore the resources of water-related industry groups and NGOs.

Dr. Loftus discussed his experience in leading a regional water supply planning initiative for the Chicago metropolitan area, and

drew on this to make recommendations about the National Water Initiative. The Initiative should better enable regional decision-makers to exchange practices and knowledge on the challenges they encounter. This would require improving vertical coordination between federal agencies and State, regional and local levels.

Mr. Johnson also discussed the poor coordination between agencies on all levels. He called for stronger federal leadership to provide unified priorities and direction nationwide.

Mr. Spooner reminded the Committee that water is of vital use to nearly every form of power generation in operation, and made several recommendations on the draft legislation. Most importantly, he stressed that the draft bill should take into account the significant water consumption that occurs during Carbon Capture and Sequestration (CCS).

Dr. Hatch provided testimony on the progress being made at the National Institute for Water Research (NIWR). The Institute benefits from a wide and established network and conducts research with funds from the USGS, with which it communicates directly. Dr. Hatch promoted NIWR as a valuable resource for implementing the National Water Initiative proposed in the draft legislation.

Chairman Lampson opened the first round of questioning by asking each witness to comment on the quality of communication between their agencies and the National Science and Technology Council's Subcommittee on Water Availability and Quality (SWAQ). Witnesses agreed that there is a lack of dialogue between federal agencies and industry as well as State and local-level agencies. When asked about the Federal Government's most significant deficiency in managing water, Dr. Hatch answered that coordination between all water-related entities could be enhanced. Mr. Christenson believed that availability and consistency of information is lacking, while Dr. Shannon reiterated the lack of diffusion of federal research into practice.

Rep. Edwards (D-MD) then asked about the practice of water conservation among industries and in domestic environments. Mr. Christenson provided a description of the efforts that the BIER organization has made to encourage conservation among beverage companies. Dr. Loftus emphasized the benefits of best-practice-sharing on conservation between regional water management agencies, and Dr. Shannon provided hypothetical goals for a national conservation strategy.

Rep. Bartlett's (R-MD) questions focused on the issues of water storage and depletion, while Rep. McNerney (D-CA) sought to discern whether conservation would have adverse effects on agriculture. The witnesses unanimously agreed that the Federal Government's involvement should not extend to nationwide control of water resources, but instead should focus on monitoring and guidance of conservation efforts.

The discussion then returned to aquifers and groundwater storage, with Dr. Shannon commenting that still very little is understood about these issues, and additional research is needed. Following this, Dr. Hatch made brief suggestions on public education methods, and then Mr. Johnson discussed the unique experiences drawn from his position as a regional manager interacting directly with the EPA (as opposed to State-level regulators).

4.2(gg)—The Foundation for Developing New Energy Technologies: Basic Energy Research in the Department of Energy (DOE) Office of Science

September 10, 2008

Hearing Volume No. 110–121

Background

On Wednesday, September 10, 2008 the Honorable Nick Lampson (D–TX) presiding, the Subcommittee on Energy and Environment held a hearing to examine the Basic Energy Sciences program at the Department of Energy’s Office of Science. The BES program supports fundamental research in physics, chemistry, materials science, and engineering with an emphasis on energy applications. A major role of the BES program is to supervise several large-scale facilities, like the major light and neutron source facilities, at various national laboratories across the country. BES is the largest program within the DOE’s Office of Science with a budget of \$1.28 billion in FY08. The broad portfolio of basic research that the BES program conducts provides essential knowledge which will foster the next generation of energy technologies.

The Subcommittee heard from four witnesses: 1) Dr. Patricia Dehmer, Deputy Director of Science, Department of Energy, Office of Science; 2) Dr. Steven Dierker, Associate Laboratory Director for Light Sources, Brookhaven National Laboratory; 3) Dr. Ernest Hall, Chief Scientist, Chemistry Technologies and Materials Characterization, GE Global Research; and 4) Dr. Thomas Russell, Director of Materials Research Science and Engineering Center on Polymers, University of Massachusetts at Amherst.

Summary of Hearing

Dr. Dehmer summarized the program, and described the Department’s efforts to integrate energy research efforts between its basic and applied programs.

Mr. Dierker testified on his experience both managing and building major light source facilities.

Mr. Hall testified on GE’s experience as an industrial user of the facilities managed by the Basic Energy Sciences program.

Mr. Russell testified on his experience as a university user of the major facilities in the Basic Energy Sciences program the value of the facilities to his research. He discussed problems with the facilities, reiterating the high demand and over-subscription.

Chairman Lampson began the question period by asking Dr. Dehmer about the coordination of research and development across the Department of Energy. She responded that research had been conducted in isolation or had been “stove-piped” in the past, but she thinks it is improving largely through the efforts of the Under Secretary of Science. He then asked if she agreed with a proposed shift of \$60 million for solar funding from Basic Energy Sciences to the Office of Energy Efficiency and Renewable Energy (EERE). She responded by saying that both offices should be robustly funded. Dr. Russell commented that this shift in funds would reduce

funding to the academic community, where research could lead to breakthroughs.

The Chairman also asked whether American competitiveness should be considered when reviewing proposals. Dr. Dierker responded that proposals should be evaluated by their impacts on industry, and that a ticket system would compromise the peer-review process. Chairman Lampson then asked about the Energy Frontier Research Centers, and whether they should be renamed as awards or collaborations. Dr. Dehmer responded that the centers were not intended to be constructed or permanent, but would rotate with the best ideas and most successful collaborations. Chairman Lampson followed with a question on the ability to attract the best talent through this format. She responded that there are many other similar centers that do not have buildings and are not permanent centers, but are simply a means to generate research.

Rep. Biggert (R-IL) asked Mr. Hall about protecting proprietary research. He replied that industry users needed to use the facilities to examine proprietary materials, which requires proper protection. He explained that a fee is charged on proprietary research when it is conducted in a national laboratory, which adds a cost for industry users. Dr. Dierker added that this is only a nominal fee that does not create a major impediment for research.

Rep. Bartlett (R-MD) asked Dr. Dehmer about the balance between creating new facilities and maintaining existing ones. She responded that this is a difficult issue that comes up often, but the facilities that were ranked as a top priority remain successful. Rep. Bartlett and Dr. Russell then discussed whether funding for basic science research should be limited to proposals with societal benefit, and how this benefit should be defined. Rep. Bartlett urged the other Members and the panel to resist any efforts to push for science with societal benefits, to which Dr. Russell explained that research proposals already require an explanation of how this work will benefit society at large. The Chairman then thanked the panel for their testimonies and adjourned the hearing.

4.3—SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT

4.3(a)—Amending Executive Order 12866: Good Governance or Regulatory Usurpation? Part I

February 13, 2007

Hearing Volume No. 110–4

Background

On Tuesday, February 17, 2007, the Honorable Brad Miller presiding (D–NC), the Subcommittee on Investigations and Oversight of the House Science and Technology Committee held a hearing to examine President Bush’s amendment (Executive Order 13422) to Executive Order 12866, which provides guidance for submitting proposed regulations to the Office of Management and Budget. The hearing attempted to examine the effects of Executive Order 13422 on the regulatory process, specifically the amendment’s use to date by the Bush Administration, its impact on the ability of agencies to adhere to the laws passed by Congress to protect public safety and health, and the practical implications of having RPOs in each regulatory agency.

The Committee received testimony from: (1) Ms. Sally Katzen, Adjunct Professor and Public Service Fellow, University of Michigan; (2) Mr. David Vladeck, Associate Professor of Law, Georgetown University; (3) Mr. Bill Kovacs, Vice President of Environment, Technology, and Regulatory Affairs, U.S. Chamber of Commerce; and (4) Dr. Rick Melberth, Federal Regulatory Policy Director, OMB Watch.

Summary of Hearing

Chairman Miller opened the hearing by noting the Committee’s responsibility to examine how science is used in the decision-making process of federal agencies within Science and Technology’s jurisdiction. He argued that Congress and the President should pay close attention to the reasoning behind an agency’s action or inaction. He then questioned whether Executive Order 13422 fomented an environment of agency inaction, secrecy, and lack of public scrutiny and accountability. He questioned whether the amendment had caused a de facto shift in power from Congress to the Executive branch.

Ranking Member Sensenbrenner (R–WI) stated his belief that much of the concern regarding the Executive Order was based on political partisanship instead of the amendment’s actual implications. His primary concerns were the amendment’s potential repercussions for the American economy and the influence of RPOs on the regulatory process.

Ms. Katzen was critical of the new Executive Order because it tightens OMB control over federal agencies, limits agency autonomy, burdens agencies to the point that they become ineffective, and disfavors policies that promote the health and safety of the American people. She cited differences between President Clinton's Executive Order 12866 and the recent Bush amendment.

Mr. Vladeck agreed and expressed concern over the massive budget cuts, staff cuts and increasing politicization of federal scientific research. He was concerned that the amendment usurps Congressional authority by directing agencies to justify regulatory action on the basis of market failure. He believed that the expansion of OIRA's authority over non-binding guidance documents hinders the efficiency in which agencies offer guidance to those affected by regulation.

Mr. Kovacs began his testimony by citing the financial impact regulations have on the American economy. He stated that the rhetoric surrounding the amendment was hyperbolic, and summarized the amendment as simply the culmination of decades of executive attempts to reform the management structure of regulatory agencies. He argued that the new requirements of Good Guidance Practices increase transparency.

Dr. Melberth testified that the Administration has a history of using regulatory tools to manipulate science and has shifted criteria for defining regulations away from health and safety toward market-based criteria. He gave an extensive example of the ineffective and inadequate regulatory process concerning the TREAD Act's requirement that cars be equipped with a system to alert drivers of under inflated tires.

The discussion period focused chiefly on issues of transparency, cost-benefit analysis, and market failure. Ms. Katzen clarified for the Chairman that the transparency provisions under Clinton's Executive Order included public communication between agencies and OIRA so that the public could deem any changes made by OIRA appropriate. Mr. Kovacs further went on to say he supported the *Information Quality Act*, stating his belief in open peer review. Ms. Katzen underlined the cost of transparency, including website upkeep and contractors salary, and her concern over the lack of funding towards this. Ms. Katzen argued that cost-benefit analysis should also be transparent, stating that agencies are not free agents, and their power to delegate comes from the Congress.

Speaking on market-failure provisions, Ms. Katzen noted several areas, such as civil rights and privacy, where the market does not even touch. All of the witnesses felt that it is difficult to determine when regulation must occur due to market failure, because the definition of market failure is often contentious and may mean different things to different people.

**4.3(b)—*Shaping the Message, Distorting the Science:
Media Strategies to Influence Science Policy***

March 28, 2007

Hearing Volume No. 110-17

Background

On Wednesday, March 28, 2007, the Honorable Brad Miller (D-NC) presiding, the Subcommittee on Investigations and Oversight met to examine the relationship between science and the media. In recent years, there have been reports of efforts within science agencies to control which federal scientists receive access to conferences or the press. Further, reports of oil business interests using profits to create the impression of doubt in the science of climate change have become increasingly common. This hearing provided general testimony on the history and present state of these matters and, more specifically, a look at climate change science as a case study of how media campaigns are mounted to confuse the public.

The Subcommittee heard from four witnesses: (1) Mr. Sheldon Rampton, co-author of books *Toxic Sludge is Good for You* and *Trust Us, We're Experts!*, and co-founder of SourceWatch.org; (2) Dr. James McCarthy, Harvard Professor and member, Union of Concerned Scientists; (3) Mr. Tarek Massarrani, Government Accountability Project (GAP); and (4) Mr. Jeff Kueter, President, The Marshall Institute.

Summary of Hearing

Chairman Miller began with concerns that the facts and science regarding global warming and climate change are challenged, manipulated, and contested in the public debate by media, big business, and the Bush Administration. From the public's perspective, climate change news stories often become little more than two "experts" staking out opposite positions. The fact that one "expert" may be articulating a consensus scientific position that represents the work of thousands of active researchers, and the other "expert" is paid to be a professional skeptic is not obvious to the average citizen.

Rep. Rohrabacher (R-CA) questioned the existence of a consensus among climate scientists. He implied that such a consensus is based on bias because of funding disparities favoring proof of, and agreement with, the idea of global warming. He also questioned what he felt was the Majority Members' assumption that private funding of scientists creates and promotes bias in the privately-funded scientists' work in favor of the private interests.

Full Committee Chairman Gordon (D-TN) reiterated the idea of a consensus that global warming was occurring and applauded the hearing for examining the process through which public doubt in commonly accepted science is manufactured by special interests for private benefit.

Mr. Rampton testified about the general practice of science manipulation for public relations purposes, describing a "modern propaganda" industry. He then commented on the frequency of endorsements from scientific experts in order to sell a product or policy in

favor of certain industries, particularly through scientific journals, and expressed concern that this practice drastically undermines scientific integrity.

Dr. McCarthy described evidence of a broad consensus on global warming developed over the previous 25 years, citing various reports, and pointed to findings of ExxonMobil's successful influence on the Bush Administration to neglect climate change findings. He provided three recommendations to mitigate problems of biased media in science.

Mr. Massarani outlined the GAP's investigation and consequent findings about the suppression of scientific communication, entitled *Redacting the Science of Climate Change*. His conclusion was that information-restricting practices often originate in executive offices and represent institutionalized infringement of federal employees' whistle blowing rights, frequently undermining the government's obligation to disseminate results of publicly funded research.

Mr. Kueter argued for a more skeptical look at climate change findings, noting that all participants in policy-making have preferences that color their interpretation of scientific research, so the research funding sources should be questioned and debated less than the research findings.

During the discussion period, the Members and witnesses debated the prevalence of specific industry campaigns adverse to general consensus of the scientific community and the Bush Administration's position on climate change. They also discussed the role of the *Freedom of Information Act*, political pressure on scientists, and scientific publication concerns, and the witnesses provided their recommendations to repair the media's role in representing scientific findings.

4.3(c)—Amending Executive Order 12866: Good Governance or Regulatory Usurpation? Part II

April 26, 2007

Hearing Volume No. 110-21

Background

On April 26, 2007, the Honorable Brad Miller (D-NC) presiding, the Subcommittee on Investigations and Oversight held a second hearing to discuss the amendments to Executive Order 12866 contained in Executive Order 13422. It attempted to discuss the Office of Information and Regulatory Affairs' (OIRA) perspective on how and why the new order was created and how it would be applied. It was also devoted to examining possible remedies to the regulatory situation.

The witnesses were divided into two panels. The first panel consisted solely of (1) Mr. Steve Aitken, General Counsel at OIRA. The second panel included: (2) Dr. Peter Strauss, Professor, Columbia Law School; (3) Mr. Gary Bass, Director, OMB Watch, (4) Dr. Robert Hahn at the American Enterprise Institute, and (5) Dr. Richard Parker, Professor, University of Connecticut Law School.

Summary of Hearing

Chairman Miller opened by noting that some of the disagreements over OIRA's role in the regulatory framework covered by Executive Order 12866 were being reopened by the changes made with Order 13422. He mentioned the new market failure requirement and prior Congressional decisions to leave such considerations out of rule-making specifically to avoid a bias against regulation. Chairman Miller expressed interest in the process of drafting E.O. 13422, the deficiencies it was designed to address, and how OIRA planned to implement it. He also wanted to hear about the advantages and disadvantages of using cost-benefit analysis and market failure as regulatory tools. Finally, he indicated his concern about the newly created RPO position and its possible effects on the regulatory process.

Rep. Rohrabacher (R-CA) defended the changes made by Order 13422, arguing that they were minor clarifications which could be rescinded by the next Presidential administration if it so chose. He claimed that the controversy had less to do with the policies themselves than who was implementing them, because any President would have the right to do what Order 13422 purported to do.

Mr. Aitken emphasized that the Order was designed to impact the release of guidance documents, not regulations. He stated that RPOs were not new positions and many of the existing ones were already subject to Senatorial approval. He explained that the "market failure" criteria was a restatement of the Clinton-era use of "failures of private markets" as a factor to justify regulation and that an agency could justify regulation without a market failure if it identified another serious problem that the agency meant to address. He claimed that most of the significant regulations issued by agencies were already in response to market failures.

Chairman Miller asked about the specifics of Order 13422's development, and Mr. Aitken answered that the standard process set out in Executive Order 11030 (Preparation, Presentation, Filing, and Publication of Executive Orders and Proclamations) was followed and it did not include releasing a draft for public comment. He touched on the draft revision process and circulation specifics. Chairman Miller also asked how the concept of market failure would be applied in real regulatory decisions and if it meant that regulation would ordinarily be discouraged. Mr. Aitken responded that in many situations, an agency has discretion to regulate, and must exercise that discretion in the case of market failure.

Congressmen Rohrabacher and Baird (D-WA) asked about Presidential accountability for regulatory statutes. Mr. Aitken explained that RPOs could now approve the agency's regulatory plan and sign off on new regulatory action. He said this was in line with the principle that the Executive appointees should decide what actions the agency engages in. He stated that there had not been any transparency requirements for the RPOs in Order 12866. He also stated that agencies must always faithfully execute the statutes which have been enacted, but Congress gave agencies discretion because of the complexity in enacting its intent. A President could use the leeway granted to the agency to mold the law's execution to his agenda.

After a short recess, Dr. Strauss stressed the importance of understanding RPO accountability and preserving the distinction between the Congressional and Presidential roles in RPO activity. He expressed concern that the changes made by Order 13422 lessened Congressional control over the federal agencies and increased Presidential control.

Dr. Hahn argued that the changes made by Order 13422 were not as substantial as critics made them out to be. He claimed that including guidance documents for OMB was a good idea and would not significantly add to an agency's regulatory burden. Given the guidance document's effects on private entities, there should be some method of outside review. He also argued that increasing Presidential control over regulators would increase accountability.

Mr. Bass pointed out that the dialogue between OIRA and federal agencies lacked transparency, which was a more critical problem. He argued that more information was needed about the responsibilities, authorities, and identities of the RPOs, as well as requiring complete disclosure of every RPO decision. He also pressed for more complete RPO communications records.

Dr. Parker noted that OIRA oversight concentrates authority with an agency with little scientific or technical expertise, despite the often scientific or technical nature of the regulatory issues. This Presidential control over process is not mandated by statute or granted by express Congressional action. Moreover, the regulatory zeal which had prompted review of regulations was greatly exaggerated and the cost-benefit system excluded many useful regulations.

During the second discussion period, Chairman Miller asked about RPOs exceeding their authority and how to mitigate this problem. Dr. Strauss suggested using Congressional budgetary authority to limit expenditures by the agencies if they strayed too far from Congressional intent, or to force a compromise with the executive branch on the transparency issue. He argued that while the Executive branch can require agencies to collect certain information before making a regulatory decision, the criteria the agency used would still be determined by statute, not by the President. His concern was that the OIRA review process was being used to paralyze regulation. Dr. Parker added that a lot depends on how language like the market failure standard is actually implemented. Mr. Bass argued that the language came dangerously close to forcing agency determinations.

4.3(d)—Transitioning the Environmental Measurements Laboratory to the Department of Homeland Security

May 3, 2007

Hearing Volume No. 110–25

Background

On Thursday, May 3, 2007, the Honorable Brad Miller (D-NC) presiding, the Subcommittee on Investigations and Oversight held a hearing to investigate the proposed closure of the Environmental Measurements Laboratory (EML) in lower Manhattan, ending a

program costing around \$7 million with expertise in measurements and study of radioactivity. In 2003 the lab was transferred from the Department of Energy to DHS's Science & Technology Directorate. But since then, the Department of Homeland Security (DHS) has taken this once valuable national asset and denigrated it—terminating programs of priceless value to both the Nation's first responders and U.S. national security community, halting others and drafting plans to close the lab completely.

The hearing was organized into three panels. The first panel included: (1) Mrs. Lynn Albin, Radiation Health Physicist, Office of Radiation Protection, Washington State Department of Health; (2) Mr. Charles F. McBrearty, Jr., Former Director of Materials Technology, Air Force Technical Applications Center (AFTAC) at Patrick Air Force Base in Florida; (3) Jonathan A. Duecker, Assistant Commissioner, Counterterrorism Bureau of the New York Police Department; and (4) Dr. Tony Fainberg, former Program Manager, Radiological and Nuclear Countermeasures, Office of Research and Development of the Science and Technology Directorate, Department of Homeland Security (DHS). The second panel included (5) Dr. John F. Clarke, Deputy Director, Office of National Laboratories in the Science and Technology Directorate, Department of Homeland Security. The third panel included: (6) Admiral Jay M. Cohen, Under Secretary for Science and Technology, Department of Homeland Security; and (7) Mr. Vayl Oxford, Director, Domestic Nuclear Detection Office, Department of Homeland Security.

Summary of Hearing

Chairman Miller opened by noting that the threat of nuclear terrorism is the most pressing current nuclear threat. The ability to detect radioactive material and quickly assess radiological levels after a disaster is a paramount concern to disaster planners. Chairman Miller commended the commitment to frugality on DHS' part, but with hundreds of millions of dollars left unspent in the S&T directorate, the loss of a resource like EML does not appropriately balance the need for this work with its cost.

Rep. McCaul (R-TX) was interested in knowing how EML fits into the needs of DHS, given its current capabilities. He noted that EML will have to adapt to a new place in the government, and commended EML's relationship with State and local entities.

Mr. McBrearty testified on the good working relationship between the Air Force Technical Applications Center and EML. When he suddenly received news of EML's closure he went to DHS personally to argue on its behalf. The decision was maintained and AFTAC moved to Los Alamos, and the Pacific Northwest labs.

Dr. Fainberg testified that the management at DHS had little idea of what was going on at EML. He argued that the lab was in poor condition and was expensive. Dr. Fainberg stated that Dr. Clarke tried to stop acquisition of new equipment for a research project that Dr. Fainberg thought was accepted. The opaque methods of DHS leadership precipitated the resignation of Dr. Fainberg from DHS.

Ms. Albin complemented EML on their Quality Assurance Program (QAP), a program that provided performance testing of radiological detection to governmental bodies for free. This testing re-

source provides assurance to first responders that the equipment is calibrated and accurate. Without this resource local governments must go elsewhere, to other federal offices and private testing labs.

Mr. Duecker testified of the numerous ways that EML helps the NYPD to defend against, plan, and prepare for a radiological attack. EML's expertise is extremely valuable to protect New York City from attack and, through the Securing the Cities Initiative, this expertise can be transferred to other cities.

In the second panel, Dr. Clarke testified about DHS reviews that found EML lacking in the ability to transfer their expertise to DHS projects. The reviews found that labs were under-used, expensive, and deteriorating, and the cost of the lab did not result in acceptable contributions to DHS; this led to Dr. McCarthy's decision to close EML. During his discussion period, Dr. Clarke briefed the Members on the details of the closing decision and the fate of EML programs.

In the third panel, Mr. Oxford explained the three core areas in which DNDO has worked with EML and concluded that EML has been a crucial partner in nuclear detection.

Admiral Cohen described his organizational priorities and accomplishments in his first year of service with DHS. Admiral Cohen told the Subcommittee that he has no plans to close EML. He intends to maintain the lab's presence in New York City and to re-emphasize the lab's core mission towards the Testing & Evaluation (T&E) of equipment.

During the discussion, Chairman Miller asked Mr. Oxford about what unique skills the EML brings to the table, and Mr. Oxford cited the agency's valuable flexibility in a changing security landscape. He noted that EML provides a valuable link between New York City officials and valuable technical assistance, and that it had a close relationship with New York first responders.

4.3(e)—The NASA Administrator's Speech to Office of Inspector General Staff, the Subsequent Destruction of Video Records, and Associated Matters

May 24, 2007

Hearing Volume No. 110-33

Background

On Thursday, May 24, 2007, the Honorable Brad Miller (D-NC) presiding, the Subcommittee on Investigations and Oversight met to investigate allegations that senior staff at the National Aeronautics and Space Administration (NASA) physically destroyed records of a controversial meeting between NASA's Administrator Michael Griffin and Office of the Inspector General (OIG) staff.

The first panel had two witnesses: (1) Ms. Evelyn Klemstine, Assistant Inspector General for Audits, NASA Office of Inspector General; and (2) Mr. Kevin Winters, Assistant Inspector General for Investigations, NASA Office of Inspector General.

The second panel had two witnesses: (1) Mr. Michael Wholley, General Counsel, NASA; and (2) Mr. Paul Morrell, Chief of Staff, NASA.

Summary of Hearing

Chairman Miller opened the hearing by noting the PCIE recommended that serious discipline be considered for Inspector General Cobb. Despite Chairman Miller, Chairman Gordon and Senator Nelson's call for his removal, Mr. Cobb remains in office with the confidence of both the President and Administrator Griffin. Mr. Cobb's conduct and relationship to NASA senior staff remains a concern to the Committee, especially in light of the destruction of Administrator Griffin's speech to OIG staff.

Ranking Member Sensenbrenner (R-WI) echoed Chairman Miller's statement, indicating that he will be recommending an investigation by the Justice Department. Destroying government property, in this case video records, brings criminal penalties under federal law.

Chairman Miller and Rep. Sensenbrenner both asked for the details of the meeting involving Mr. Cobb and Mr. Griffin compared to NASA's general meeting practices. Mr. Winters stated that he had never attended an all-hands meeting which was not recorded. Ms. Klemstine said it was obvious the meeting was being recorded and she only discovered later that NASA management wanted the video records destroyed.

Chairman Miller then asked about the atmosphere during the meeting itself. Mr. Winters responded that there was tension during the meeting, since Administrator Griffin discussed allegations against Mr. Cobb with Mr. Cobb present. In Mr. Winter's opinion, the image of the head of NASA appearing with Mr. Cobb to discuss the allegations with the Office's staff looked bad. After the meeting, Ms. Klemstine wrote an e-mail to the Deputy Inspector, Thomas Howard, documenting staff concerns.

Chairman Miller then asked the panel when they discovered the recording of the meeting had been destroyed. Mr. Winters discovered the destruction after the fact. Ms. Klemstine explained that she was informed about the records' destruction by a member of her staff, but ultimately decided not to interfere.

The second panel began with Mr. Wholley, who stated that Mr. Morrell did not instruct him to destroy the records but that he had reviewed the *Federal Records Act* (FRA) and determined that their retention would mean they became protected records and thus could not be destroyed later. He had no role in the monitoring of Mr. Cobb's actions under the corrective action plan offered by Mr. Griffin. He claimed that he did not destroy the records in an attempt to conceal their content and apologized for causing a need for a hearing.

Mr. Morrell explained that he had ordered the meeting not to be recorded and then noticed recording equipment in the meeting. He learned from the facility manager where the meeting was held that the order to record it had come from the Office of Public Affairs. He had requested the copies of the meeting's video records from the Office of Public Affairs and left them with Mr. Wholley. He asserted that he had not ordered the records' destruction and was unaware of that fact until later.

During discussion, Mr. Morrell stated that he wanted to encourage open and honest dialogue during the meeting and that the recording would inhibit dialogue. When asked if Mr. Cobb's presence

and proximity to Mr. Griffin discouraged open dialogue during the meeting, Mr. Morrell admitted that that may have been a factor. Mr. Morrell explained that he had never intended for the records to be destroyed, but had simply requested that Mr. Wholley look into the legal possibilities. He stated that he had later avoided direct contact with the witnesses because of his involvement in the destruction of the video records. On Mr. Morrell's claim that he had not been involved in the video tapes destruction, Ranking Member Sensenbrenner showed an e-mail from the facility manager stating the opposite.

Rep. Sensenbrenner asked whether the video records were public records, as he believed, and if Mr. Wholley had done the relevant legal research to find out, which he believed Mr. Wholley had not. He asked if the relevant law allowed the destruction of records to avoid their publication and concluded that it did not. Mr. Wholley admitted that he was unfamiliar with the law on the subject and that he had destroyed the video records in his belief that they were not yet federal records and had not considered the political implications of his actions.

Chairman Miller asked Mr. Wholley why he had not consulted one of the attorneys in the General Counsel's office with more expertise before destroying the video records. Mr. Wholley answered that he preferred to do his own research, especially regarding such a sensitive matter. Miller then asked if Mr. Wholley was aware of the evidentiary implications of destroying records regarding a matter under Congressional investigation. Wholley answered that destroying records about a matter under investigation allowed the legal inference that the destruction was a cover-up, but claimed not to have considered long-term implications of his actions.

Finally, Chairman Miller asked about the nature of Mr. Wholley's relationship with Mr. Cobb. Mr. Wholley said that he met weekly with Mr. Cobb about matters before their offices, that they had discussed their respective interviews with Committee staff, though not substantively, and that they discussed leadership on occasion.

4.3(f)—Oversight Review of the Investigation of the NASA Inspector General

June 7, 2007

Hearing Volume No. 110-37

Background

On June 7, 2007, the Subcommittee on Investigations and Oversight held a joint hearing with the Senate Subcommittee on Space, Aeronautics and Related Sciences to review the matter of NASA Inspector General Robert "Moose" Cobb in 253 Russell Senate Office Building. Cobb continues to serve as NASA Inspector General after a six-month investigation by the President's Council on Integrity and Efficiency (PCIE) found that Cobb had abused his authority and exhibited the appearance of a lack of independence from NASA management. In response to the report, Chairman Gordon (D-TN) of the House Committee on Science and Technology, Chairman Miller (D-NC) of the House Subcommittee on Investigations and Over-

sight, and Senator Nelson (D-FL), Chairman of the Senate Subcommittee on Space, Aeronautics and Related Sciences asked the President to remove Mr. Cobb. This hearing examined how Mr. Cobb conducted himself in his office in order to allow Members to engage the broader questions of the proper relationship of an Inspector General to the agency and to Congress.

The first panel included the following five witnesses: (1) Mr. Kevin Carson, former Assistant IG for Audits; (2) Mr. Lance Carrington, former Assistant IG for Investigations; (3) Ms. Deborah Herzog, former Deputy Assistant IG for Investigations; (4) Ms. Danielle Brian, the Director of the Project on Government Oversight (POGO); (5) Professor Paul Light, New York University.

The third panel included: (6) Mr. Robert Cobb, Inspector General, NASA.

Summary of Hearing

Senator Nelson opened by citing numerous allegations against Mr. Cobb. For example, in 2002 Mr. Cobb failed to notify the U.S. State Department that NASA computers were being hacked into, of two events in 2004 and 2005 where Mr. Cobb blocked or slowed search warrants against NASA properties, and the 2002 blocking of an OIG investigation into the safety of the Space Shuttle Endeavour. He states that there are no longer boundaries between NASA's management and the Office of the Inspector General, and sees this as a direct result of Mr. Cobb's actions.

Full Committee Chairman Gordon noted that IGs need to be independent to effectively conduct their job. He noted that, if an IG views him or herself as part of an agency's management team, then they can't be an effective check on that management team. He stated that it was clear that, from the very beginning, Mr. Cobb saw himself as a part of Sean O'Keefe's team. Chairman Gordon ended by once again requesting Mr. Cobb's resignation.

In his opening statement, Subcommittee Chairman Brad Miller discussed Mr. Cobb's abusive behavior, though he said it was most important that the hearing focus on the Inspector General's lack of independence from NASA. He was frustrated that Mr. Cobb admits no wrong, blames others for all of his problems and has learned nothing from the PCIE investigation.

Mr. Kevin Carson's testimony outlined his experiences as an auditor at the NASA OIG prior to and during Mr. Cobb's post as Inspector General. He noted a number of instances where the previous Inspector General had investigated safety issues at NASA and reported controversial results without fear of Agency repercussions. Mr. Cobb, on the other hand, frequently had NASA management review audit reports before they were officially released. Mr. Carson also noted that Mr. Cobb berated the auditing staff if he disagreed with their results. Mr. Cobb eventually merged the Office of Investigations with the Office of Audits, moving the Office of Audits to NASA's headquarters in order to, as Mr. Carson said, "choke" the auditors and prevent them from producing unbiased reports.

Ms. Debra Herzog's testimony focused on Mr. Cobb's use of profanity to intimidate his staff, and his hesitancy to issue warrants against NASA. She explained that she regularly observed or heard

of Mr. Cobb using profanity to humiliate and demean employees. Herzog also named several instances where search warrants were approved on NASA properties, only to be delayed by Mr. Cobb, who would not accept the warrants without much persuasion.

Mr. Lance Carrington provided more examples of Mr. Cobb's abusive behavior. For example, Cobb referred to special agents as "knuckle draggers" and described their work as crap; regardless of any successes. Cobb also routinely used profanity when he spoke to employees. Carrington also described instances where Mr. Cobb avoided acting on search warrants until he was told that the F.B.I. would be implementing them, regardless of the OIG's actions.

Dr. Paul Light outlined the criteria of what the Congress intended when creating the office of Inspector General. He explained the Inspector General should have expertise on the area which he or she is operating, "be a strong manager of the office," "be assertive," have "maximum independence," and have an "impeccable reputation."

Ms. Danielle Brian of POGO testified that Mr. Cobb's actions were extremely inappropriate for an Inspector General. She cited such examples as his frequent social outings with NASA administrators and the reduced number of audits performed during Mr. Cobb's tenure. She also explained that NASA Administrator Griffin's role in the IG office meetings and appointments showed a complete lack of independence of the OIG.

In response to the allegations against him, Mr. Robert Cobb testified that he did not suffer from a lack of independence, but merely gained the confidence of Administrators O'Keefe and Griffin. He disagreed with the Integrity Committee's findings. He admitted to verbally abusing his staff, but said that they occurred on a limited number of occasions. He also addressed his reasoning in slowing search warrants, saying that in some cases he was unsure that a crime had been committed or that he wanted to gather further evidence before executing the search. He also argued that the small number of audits was not due to his lack of independence and therefore a hesitancy to hold NASA accountable, but was because NASA was more willing to cooperate with him. He also denied that he was "in the pocket" of NASA's leaders, describing his friendly relationship as being part of his job in keeping a less tense relationship with the heads of the Agency. Essentially, the Inspector General admitted no fault in any of the cases presented before the Joint Committee, and, conversely, considered all allegations to be the result of a few disgruntled employees.

4.3(g)—The duPont Aerospace DP-2 Aircraft

June 12, 2007

Hearing Volume No. 110-38

Background

On June 12, 2007, the Honorable Brad Miller (D-NC) presiding, the Subcommittee on Investigations and Oversight held a hearing to examine the history, technical viability, critical assessments, testing mishaps and management of the DP-2 Vertical/Short Take-off and Landing (V/STOL) aircraft being developed by the duPont

Aerospace Company. The DP-2 program, funded exclusively through congressional earmarks since 1988, has received more than \$63 million. Yet, multiple technical reviews of the DP-2 concept have repeatedly rejected it on its technical merits since 1986 and serious concerns continue to arise about the ability of duPont Aerospace to effectively and safely manage the program. Three DP-2 prototype aircraft have been developed and the DP-2 has suffered from four mishaps in the past four years. The Subcommittee on Space & Aeronautics held a hearing on this project in May 2001.

The purpose of this hearing was to review the technical virtues of the DP-2, concerns about the safety of the aircraft, duPont Aerospace's management of the program and the company's adherence to safety protocols and procedures. This is particularly important given the fact that Tony duPont, President of the duPont Aerospace Company, envisions the development of a commercial version of the DP-2 aircraft. Finally, the Subcommittee examined what sort of return on investment the U.S. Government has received for its two decades of support and more than \$63 million investment in this program to date.

The first panel included: (1) Rep. Duncan Hunter (R-CA), Ranking Member, Armed Services Committee.

The second panel included: (2) Mr. John Eney, Former Head, Aircraft Conceptual Design Group, Naval Air Development Center and Naval Air Systems Command; (3) Dr. William Schreuren, Former DARPA DP-2 Program Manager; and (4) Mr. Mark Deadrick, Former DuPont Aerospace Employee.

The third panel included: (5) Mr. Anthony "Tony" duPont, President, duPont Aerospace Company.

The fourth panel included the following four witnesses: (6) Mr. John Kinzer, DP-2 Program Manager, Office of Naval Research; (7) Col. G. Warren Hall, NASA AMES Chief Test Pilot, Chairman, DP-2 Air Worthiness Review Panel; and (8) Lt. Col. Michael Tremper, Defense Contract Management Agency, Resident Pilot, duPont Aerospace Company.

Mr. Hunter has been a long-time supporter of the DP-2.

Summary of Hearing

Chairman Miller opened the hearing by explaining the vision of the DP-2, an aircraft capable of vertical takeoff. The Chairman questioned the ability for the DP-2 project to ever take off as to date the aircraft has yet to achieve flight.

Full Committee Ranking Member Hall (R-TX) expressed the merits of the DP-2 program and the importance of continuing funding for it.

Rep. Hunter has been a long-time supporter of the DP-2. During his testimony, he indicated that the Armed Services Committee has been interested in the project, citing other successful projects which took a long time to complete, but were beneficial in the long run. During the first discussion period, Chairman Miller asked Rep. Hunter how to make a good judgment call on a project when so many experts are asking for its termination. Rep. Hunter believed that some experts still saw merits in the DP-2 project.

On the second panel, Mr. Eney testified about the lack of success seen in a 1986 launch of the DP-2 aircraft and did not see hope

for it in future assessments, as it was constantly rejected by non-partisan experience engineers and scientists. Mr. Eney first reviewed the DP-2 concept in 1986 and later led a team of senior Navy aerospace engineers on a site visit to the duPont Aerospace facilities in San Diego in 1999 while the first DP-2 prototype was partially completed.

Dr. Scheuren was on a DARPA review team that provided a critical evaluation of the technical merits of the DP-2 concept in 1990. He later became the DARPA DP-2 Program Manager in the mid-1990s and is former Commanding Officer of the first Marine Corps Harrier Squadron. He testified on some of the technical limitations to the DP-2.

Mr. Deadrick was the former Manufacturing Engineering Manager at duPont Aerospace Company. Mr. Deadrick first began working for duPont Aerospace as a college intern in 1988. He was employed as a full time Mechanical/Aerospace Engineer at duPont from 1992 to 1994 and as Manufacturing Engineering Manager from 2002 to 2005, when he was in charge of the composite fabrication and assembly of the DP-2 aircraft. He discussed his experience working on the DP-2, citing the technical merits of the project but also its mismanagement.

Much of the discussion focused on the mismanagement and problems with the program. Dr. Eney discussed problems with DP-2's vectored thrust. He also believed that the DOD is the best judge of the program, stating that Congress should be consistent with DOD's evaluation. The panelists and the Members further engaged in conversation about the technical aspects of the program, comparing its success with the Harrier jet.

During his testimony, Mr. duPont stressed the fact the DP-2 is currently a research project. He also cited the success of DP-1 as a reason to continue funding for DP-2. He attested that the DP-2 was almost ready to fly, but it needs to be backed by more funding. During discussion, he attested that the DP-2 project would be less expensive than a V-22 project, but not necessarily an inexpensive project. He also explained despite its intensity, vertical thrust would have little consequences on the ground below the aircraft.

On the fourth panel, Mr. Kinzer testified on the status of DP-2, stating that it had yet to achieve extended hover. Col. Hall testified on his time as the Chairman of NASA's Airworthiness and Flight Safety Review Board, as he had oversight over the DP-2 project.

Col. Tremper is a pilot for Delta Airlines and has been the Government Flight Representative to duPont Aerospace since 1999 providing operational oversight of the DP-2 program. He remarked that the DP-2 project received a "high risk" rating by the Aviation Program Team, citing four mishaps involving the test aircraft.

During the discussion period, Mr. Kinzer disagreed with Mr. duPont's estimates on the capability of the DP-2 aircraft, believing its range and payload to be considerably lower than what Mr. duPont had stated. He was skeptical whether DP-2 could safely achieve forward flight, and Col. Tremper added they were non-compliant with safety inspections. On a final note, Col. Tremper noted the importance of funding research on the concept of vector

thrust, with Mr. Kinzer adding that DP-2 does have the potential to demonstrate extended hover.

4.3(h)—The Department of Energy's Support for the Savannah River Ecology Laboratory (SREL), Part I

July 17, 2007

Hearing Volume No. 110-45

Background

On July 17, 2007, the Subcommittee on Energy and Environment and the Subcommittee on Investigations and Oversight held a joint hearing entitled "*The Department of Energy's Support for the Savannah River Ecology Laboratory (SREL), Part I.*" The purpose of the hearing was to examine the past and current work of the Savannah River Ecology Laboratory (SREL), its relationship to the Savannah River Site and the Communities bordering the Site, and the events leading to the Department of Energy's (DOE) decision to withdraw funding for the laboratory in fiscal year 2007.

SREL is a research laboratory owned by the University of Georgia that studies and monitors the radiological waste held at the Savannah River Site (SRS), a National Environmental Research Park (NERP). The laboratory maintains long-term records of environmental indicators and engages in other research pertaining to the effect of the pollutants held there on natural and artificial environments, including agricultural systems. This first part of a two part hearing looked into the scientific validity of the work at SREL.

The hearing heard testimony from two panels. The first panel included: (1) the Honorable John Barrow (D-GA), Representative of Georgia's 12th Congressional District. The second panel included: (2) Dr. Jerry Schnoor, professor of civil and environmental engineering, University of Iowa; and (3) Dr. Ward Whicker, Professor of Radio-biology, Colorado State University.

Summary of Hearing

Chairman Brad Miller (D-NC) opened the hearing by decrying the actions and the threatened closure of SREL. He stressed the quality and independence of SREL's work, which was useful not only in maintaining the safety of the Savannah River Site, but has helped others understand other polluted areas. Chairman Miller accused DOE of creating a unique process to review SREL's funding, a process designed to shut it down. Chairman Lampson (D-TX) added that the lab has saved the public millions of dollars through a better understanding of the environmental challenges of this pollution.

Ranking Member Sensenbrenner (R-WI) expressed disappointment that the hearing began by accusing DOE of impropriety without anybody from DOE present to defend itself. Chairman Miller stated that extraneous events and the second hearing provides ample opportunity for fairness in this process. Rep. Sensenbrenner agreed that SREL has done good science but thought the issue was what went wrong with the DOE in making their decisions.

Rep. Barrow testified that SREL and the surrounding NERP are crucial tools to understand out pollutants interact in the environ-

ment. The fact that the government has created these areas means that the kind of monitoring and science SREL does should be done. He further stated that a private contractor cannot provide the quality of monitoring that SREL has done.

Dr. Schnoor is independent of SREL but knowledgeable of its work. He testified that the ecological risks of pollution are better understood at SREL than anywhere else in the United States. SREL provides independent and verifiable information on the remediation of the pollutants found on the site.

Dr. Whicker testified to the importance of SREL's work, especially in clean-up risk analysis. He explained that there are thresholds in clean-up as contamination increases. Understanding the conditions where it is useful to commit to a more drastic technique requires good science, and SREL has been instrumental in this research. Furthermore, the basic research of pollutant movement and natural sequestration clarifies existing risks and characterizes new ones in environmental clean-up.

During questions, Dr. Whicker testified that a private contractor could not have done the SRS risk assessment that SREL does. Dr. Schnoor emphasized that the method for remediation at SRS, Monitored Natural Attenuation (MNA), cannot be done without long-term monitoring. Rep. Sensenbrenner asked why SREL doesn't support itself through normal peer-review grants. Dr. Schnoor responded that SREL does compete for research grants, and its specially appropriated funds are for operating and infrastructure costs, like other national laboratories.

4.3(i)—The Department of Energy's Support for the Savannah River Ecology Laboratory (SREL), Part II

August 1, 2007

Hearing Volume No. 110-50

Background

On August 1, 2007 the Subcommittee on Energy and Environment and the Subcommittee on Investigations and Oversight held a joint hearing entitled "*The Department of Energy's Support for the Savannah River Ecology Laboratory (SREL), Part II.*"

The Savannah River Ecology Laboratory was founded by University of Georgia in 1951 to monitor the environmental effects of the Savannah River Site (SRS) which is home to the much larger Savannah River National Laboratories (SRNL). It is run by the University of Georgia (UGA) and operates under agreements made with the Department of Energy (DOE).

It has regularly obtained individual and specific funding within the DOE. SREL lost this funding in Fiscal Year (FY) 2006. The Georgia and South Carolina Congressional delegations met with DOE, UGA, and SREL to reverse this decision. An agreement was made in May 2005 to ease the transition by allocating \$4 million in FY06 and \$1 million FY07 and with an invitation to seek funding elsewhere. The Director of SREL then set to establish a new cooperative agreement with the SRS through its Director, Mr. Jeff Allison. This agreement funded SREL \$20 million over four years. Mr. Allison then was made aware of the previous agreement in

May 2005, and was told to make his offer commensurate with this. As a result SREL lost this funding, and instead any additional funding would come pending a technical-peer review of its proposed tasks based on a mission critical need. The proposal from SREL of 27 tasks totaling about \$3 million was reduced to six tasks for \$800,000 by the judgment of DOE Project Directors. Given this and a lack of outside funds, SREL is threatened with closure.

The witnesses were convened into four panels. The first panel held: (1) Hon. Clay Sell, Deputy Secretary of Energy, U.S. Department of Energy. The second panel held: (2) Dr. Paul Bertsch, former Director, Savannah River Ecology Laboratory, and (3) Ms. Karen Patterson, Chair of the Citizens Advisory Board (CAB), Savannah River Site. The third panel held: (4) Mr. Jeffrey M. Allison, Manager, Savannah River Operations Office; (5) Mr. Charlie Anderson, Principal Deputy Assistant Secretary, Office of Environmental Management, (6) Mr. Mark Gilbertson, Deputy Assistant Secretary, Engineering and Technology, Office of Environmental Management; and (7) Ms. Yvette T. Collazo, Assistant Manager, Closure Projects, Savannah River Operations Office. The fourth panel held (8) Dr. Raymond L. Orbach, the Director of the Office of Science, Department of Energy.

Summary of Hearing

Chairman Miller (D-NC) opened the hearing by stating that SREL's work has lead to better understanding of the SRS site and to pollution in general. It was, by any financial measure, a very inexpensive lab to operate and it would be difficult to find a better return on investment anywhere in the federal science complex.

Chairman Lampson (D-TX) questioned why Mr. Allison would negotiate a new agreement if SREL was supposed to become independent. He doubts that DOE negotiated in good faith with SREL given the documented record. Chairman Lampson said that whatever plans DOE has for SREL, they should be firm and transparent. He expressed his hope that, given SREL's exemplary track record, it would continue to be independent and adequately funded.

Ranking Member Sensenbrenner (R-WI) criticized the Chairman's bad faith in the operation of the hearing, and accused the Democrats of trying to paint the DOE in a bad light. He defended the DOE and said that they acted in good faith by fulfilling established agreements.

Ranking Member Inglis (R-SC) defended the nature of independent financing for SREL through a project by project basis. He condemned the public sector's resistance to change compared to the private sector's flexibility. Rep. Inglis suggested that DOE might be getting better research for the cost through these different methods.

Ranking Member Hall (R-TX) also recognized the good work that SREL has done. He thought that in May of 2005 it was well known that SREL would have to operate independently and with less money. He commended the efforts of Mr. Anderson and Ms. Sigal in obtaining two more years of funding. He concluded that it was Dr. Bertsch's responsibility to find suitable funding options.

Mr. Sell defended DOE by reiterating that they did not act in bad faith. DOE wanted to end special support for SREL and make

it an independent UGA run lab. Mr. Sell stated that it was implicit in the 2005 agreement that non-competitive funding would end after FY07. He cited the example of SRNL which became an independently funded laboratory that has expanded and increased its budget while thriving through such funding means. He stated that SREL and UGA are responsible for the unsuccessful transition.

During the discussion, Mr. Sell emphasized that the agreement between UGA and DOE implied that SREL would become independent, and that SREL knew this by quoting a statement from Dr. Bertsch in July 2005. Dr. Bertsch said that if federal funding ends, he would look for other funding sources. Questions also emphasized that the requirement for independence was not delineated within any of the agreements. Mr. Sell could not specify any studies assessing a closure of SREL. He could not say if the jobs terminated at SREL are now contracted out.

Dr. Bertsch, the former director of SREL, discussed SREL's importance, such as its role for monitoring SRS's long-term waste. Dr. Bertsch explained that until May 7, 2007, he was consistently told by SRS management and program staff that SREL's work was important, that there was a need for the work, and that there was sufficient funding for the work. He also noted that in his 23 years at SREL, all contracts were developed with the SRS Site Manager and program staff and, until now, there had never been involvement from DOE-HQ of this magnitude.

Ms. Patterson testified that the Citizens Advisory Board supports SREL because it provided independent analysis of actions by the DOE at SRS. She lamented the loss of expertise, data sets, and scientific legitimacy.

During the discussion, Dr. Bertsch said that DOE had never previously asked SREL to compete for grants. He thought that with the Allison agreement, SREL would be under the Environmental Management portfolio at DOE and not Office of Science. Furthermore he wondered what exactly independence was, since he worked in DOE owned labs and buildings and studied the Savannah River Site; without DOE there is no SREL. Ms. Patterson argued that a private contractor would not carry the same legitimacy as SREL environmental analysis.

Mr. Anderson testified that DOE wanted UGA to take a lead in SREL funding, since it was going to be cut. He noted that SREL was not abruptly cut, but had two years to transition to UGA. Additionally, he claimed that competitive funding was successful since SREL won \$800,000 in DOE funding. Any blame for SREL's financial troubles should be placed on UGA.

Mr. Allison testified that despite the 2006 agreement, the previous May 2005 agreement had to be honored, leading to SREL's reduced funding. He remains hopeful about future work with SREL.

Mr. Gilbertson discussed his role in DOE to ensure that all research is done efficiently. He led the review of SREL's proposal and helped UGA guide SREL's new direction.

Ms. Collazo's did program oversight for SREL. This oversight lead to \$1.8 million total from DOE with operational costs included. She believes that DOE has met its commitments in good faith.

Questions began with Allison responding that he received no direction on what terms the cooperative agreement would be made. Mr. Allison did say that now SREL is needed for sewer and groundwater research. The “mission critical” standard to Mr. Allison meant those actions required for cleanup; Mr. Gilbertson said it is the broad discretion of the project directors. Mr. Allison responded that there was no place to submit the projects that were rejected.

Mr. Orbach affirmed DOE’s Environmental Remediation Sciences Division policy that all research funds are peer-reviewed and merit based. As this was being carried out, FY06 represented a budget crunch for Office of Science, and the specific funding for SREL was cut.

Mr. Orbach, during questions, established that SREL did not lose confidence of the Office of Science during the FY06 budget; however, given the needs of the Office of Science there was no analysis of activities done by SREL outside the Office’s interests. The loss of funding was precipitated by a shift of focus away from surface ecology and to subsurface ecology. Mr. Orbach testified that this change reflects the current knowledge of subsurface transport of pollutants is lacking and could pose significant problems.

4.3(j)—The National Security Implications of Climate Change

September 27, 2007

Hearing Volume No. 110–58

Background

On Thursday, September 27, 2007, the Honorable Brad Miller (D-NC) presiding, the Subcommittee on Investigations and Oversight met to examine current thinking on the nature and magnitude of the threats that global warming may present to national security and to explore the ways in which climate-related security threats can be predicted, forestalled, mitigated, or remedied. The hearing looked at the current state of research into the dangerous consequences of climate change, as well as the strategic thinking that is being developed in hopes of anticipating and coping with such threats.

There were two panels of witnesses. On the first: (1) General Gordon R. Sullivan, USA (Ret.), Chairman, Military Advisory Board, the CAN Corporation; and (2) Mr. R. James Woolsey, Vice President, Booz Allen Hamilton. On the second: (3) Dr. Alexander Lennon, Research Fellow, International Security Program, Center for Strategic and International Studies; (4) Dr. Andrew Price-Smith, Professor, Department of Political Science, Colorado College; and (5) Dr. Kent H. Butts, Director, National Security Issues, Center for Strategic Leadership, U.S. Army War College.

Summary of Hearing

Chairman Miller opened the hearing by warning that climate change could result in severe political and economic instability, noting that the unrest created by the Great Depression were the seeds of World War II.

Ranking Member Sensenbrenner (R-WI) warned against creating an overly apocalyptic, politicized response to climate change, emphasizing the need for an eye on energy independence and competitive economic development in the fight against global warming.

General Sullivan asserted that the Military Advisory Board found climate change to be a serious threat to America's national security and to the rest of the world and provided five recommendations to address these issues, calling for immediate action despite any scientific uncertainties.

Mr. Woolsey explained the threats of climate change in two categories, the "malignant," and the "malevolent," arguing that the most dangerous effect of climate change is sea level height change and providing a number of recommendations for action.

During their discussion period, Mr. Woosley and General Sullivan confirmed Chairman Miller's suggestion that rapid action is critical. At Rep. Sensenbrenner's request, each witness offered their advice for American action in foreign countries to promote stability and goodwill toward the U.S. simultaneously. Both witnesses explained the relationship between human behavior and climate change. The witnesses also discussed energy sources, military prioritization, alternative, green technologies, emissions reductions, and public support for mitigating climate change.

After a short recess, Dr. Lennon explained that as climate change worsens, American security will be most threatened by nations around the equator, and he offered what he saw as the four greatest security risks. First, climate change would exacerbate water, food, and energy shortages and increase the risk of at least political stress if not resource conflicts, possibly over water in the Middle East and even sources of protein, such as fish, in East Asia. Second, while many countries will face stress from climate change, potential consequences in China present unique challenges because of its geopolitical significance. Third, migration within and from south Asia and sub-Saharan Africa, including to Europe, threatens our foreign policy and national security interests. Finally, and potentially of greatest concern, are that the effects of global climate change will increase the risk of State weakness and failure, exacerbating the threat of global terrorism over the next generation.

Dr. Price-Smith explained the impact of changes in precipitation on rates of infectious disease and the relationship of health to economic and political stability.

Dr. Butts profiled the Department of Defense's role in addressing climate change and offered recommendations for its actions in the future. Specifically he focused on the value of the regional combatant commands in building sovereign nation capacity for mitigating destabilizing climate change threats.

During the discussion, Rep. Hooley (D-OR) asked about the need for new multi-national cooperative structures. Dr. Butts argued that the necessary institutions are in place, but Dr. Price-Smith saw deficiencies in public health organizations and suggested a study for a reorganization plan. Dr. Lennon suggested more international summit conversations. Dr. Price-Smith added evidence of existing trends in disease vectors. Dr. Butts provided Rep. Hooley with further recommendations for encouraging appropriate action in the DOD, calling for a more centralized climate change system.

***4.3(k)—Disappearing Polar Bears and Permafrost: Is
a Global Warming Tipping Point Embedded in the
Ice?***

October 17, 2007

Hearing Volume No. 110-64

Background

On Wednesday, October 17, 2007, the Honorable Brad Miller (D-NC) presiding, the Subcommittee on Investigations and Oversight held a hearing on the impacts of global warming on the Arctic. This hearing provided the Committee with an opportunity to hear from witnesses on three inter-related matters: (1) the current situation in the Arctic, including the situation facing the polar bear, (2) ways in which warming in the Arctic may accelerate global warming, especially through the emission of more greenhouse gases, and (3) interim steps that could be taken to reduce greenhouse gas emissions while the Congress weighs more elaborate carbon trade or tax proposals.

There were four witnesses (1) Dr. Sue Haseltine, Associate Director for Biology at the U.S. Geological Survey, U.S. Department of Interior; (2) Ms. Kassie R. Siegel, Director of the Climate, Air and Energy Program at the Center for Biological Diversity; (3) Dr. Richard Alley, Evan Pugh Professor of Geosciences at Pennsylvania State University, and, finally; (4) Dr. Glenn Juday, Professor at the School of Natural Resources and Agricultural Sciences, University of Alaska at Fairbanks.

Summary of Hearing

In his opening statement, Chairman Miller provided background on both causes and potential consequences of warming trends. Because sea ice is the primary hunting habitat for polar bears, its continuing decrease will, according to the U.S. Geological Survey estimates, result in the extinction of two-thirds of the polar bear population by 2050. Scientists are also concerned about “tipping points,” or atmospheric processes that could lead to irreversible changes in the sea level and global climate. He stated that the U.S. must not ignore the threat of global warming but embrace the challenge of diminishing it.

Ranking Member Sensenbrenner (R-WI) agreed that climate change and Arctic melting are worrisome, though disagreeing with the urgency of counteracting the warming. He proposed that combating climate change should include both reducing greenhouse emissions while still meeting the U.S.’s energy demands through technologies such as nuclear power. He sees the USGS study on polar bears encouraging in that there will still be a viable population of polar bears in a century, regardless of the decrease in numbers.

Dr. Sue Haseltine, the Associate Director for Biology at the U.S. Geological Survey, U.S. Department of Interior discussed their findings regarding the future of the polar bear. Recent data published by USGS and Canadian scientists document lower survival rates among young and sub-adult bears and establish scientific

linkages between less ice cover, reduced survival, and population decline.

Ms. Kassie R. Siegel, Director of the Climate, Air and Energy Program at the Center for Biological Diversity, explained that government scientists predicted the polar bear would be extinct in Alaska by 2050 if current greenhouse gas emission trends continue. She explained that we need to reduce carbon dioxide emissions, methane and black carbon emissions. Reducing methane and black carbon emissions are currently at a cost-benefit or at no cost. She explained that methane could be captured from landfills and agricultural areas and used for electricity. She also explained how using energy efficient appliances and correcting pipeline leakages could significantly cut emissions.

Dr. Richard Alley, Evan Pugh Professor of Geosciences at Pennsylvania State University, appeared before the Committee to testify about the findings of the IPCC report earlier this year. He discussed sea ice, albedo and ice sheet melting.

Dr. Glenn Juday testified on the state of natural carbon sinks. He stated that temperature rise in Alaska is causing permafrost layers to thaw, which will result in additional methane emissions, difficulties constructing railroads, roads, pipelines, and buildings. He also discussed the health of a major carbon dioxide sink, the boreal forests. He noted that there is an increasing number of boreal forests in the "kill zone" where warm temperatures cause tree death.

During the discussion period, Chairman Miller noted a recent paper by Dr. Willie Soon, an astrophysicist, that paints a more optimistic view on polar bear survival. He asked if astrophysics is one of the disciplines that have an intersection with research in the Arctic or into polar bears. Each witness commented that they did not agree with Dr. Soon's interpretations. Ms. Siegel also noted that the publication in which Mr. Soon's studies are printed is not a legitimate scientific publication.

Rep. Rohrabacher (R-CA) mentioned several times throughout the hearing that climate scientists skewed results in order to get funding. Mr. Alley contested that he would never skew scientific information to secure funding, and doubted that his colleagues would either. Rep. Rohrabacher also asked Ms. Siegel whether her organization received funding from George Soros, which Ms. Siegel denied. Chairman Miller mentioned that Dr. Hansen had also submitted testimony saying he had, at no time, received funding from Mr. Soros.

When Rep. Rohrabacher asked the witnesses whether carbon emissions caused global warming, or in fact, emissions were caused by warming. Mr. Alley gave a long and detailed response explaining that CO₂ emissions both cause and are caused by warming, hence the cascade of warming the Earth is now experiencing. He explained that though the nature of the Earth's orbit does cause a warming cycle, our current warming trend is larger than that naturally caused by the orbit.

**4.3(l)—Radiological Response: Assessing
Environmental and Clinical Laboratory Capabilities**

October 25, 2007

Hearing Volume No. 110-67

Background

On October 25, 2007, the Honorable Brad Miller (D-NC) presiding, the Subcommittee on Investigations and Oversight held a hearing to discuss U.S. environmental and clinical radiochemistry laboratory capacity to respond to a detonation of a Radiological Dispersal Device (RDD) or dirty bomb.

The witnesses at the hearing were: (1) Ms. Dana Tulis, Deputy Director of the Office of Emergency Management (OEM), Environmental Protection Agency; (2) Dr. Robert T. Hadley, Lawrence Livermore National Laboratory, Department of Energy and Chair of the Federal Radiological Monitoring and Assessment Center's (FRMAC) Laboratory Analysis Working Group; (3) Dr. Robert L. Jones, Chief of Inorganic Toxicology and Radionuclide Labs, Centers for Disease Control and Prevention and Co-Chair of the Integrated Consortium of Laboratory Networks (ICLN) Network Coordinating Group's Radiological Laboratory Response Workgroup; (4) Dr. John Vitko, Director of the Chemical and Biological Division, Science and Technology Directorate, Department of Homeland Security; and (5) Dr. John Griggs, Chief of the Monitoring and Analytical Services Branch, U.S. Environmental Protection Agency (EPA), Office of Radiation and Indoor Air, National Air and Radiation Environmental Laboratory (NAREL) and Co-Chair of the ICLN Network Coordinating Group's Radiological Laboratory Response Workgroup.

Summary of Hearing

Ms. Tulis outlined EPA's current testing capacity as well as its interagency efforts with the Department of Homeland Security (DHS) and the Department of Health and Human Services (DHHS). She discussed EPA's real-time air monitoring program, RadNet, and its unique responsibility to manage the response to a radiological incident as well as the establishment of an all-media laboratory response network, called eLRN.

Dr. Hadley explained FRMAC's mission and the role it played during recent counter-terrorism exercises. He highlighted FRMAC's capabilities during the emergency phase of a radiological disaster, or the first four to seven days, but noted it did not attempt to deal with long-term remediation.

Dr. Jones discussed the public health response needed after a dirty bomb attack. He explained that after an attack, health officials will need to determine what people were exposed to, who was exposed, and their exposure level. According to Dr. Jones, the Nation's ability to answer these questions is limited. The nation does not have the necessary public health infrastructure and that considerable applied method development remains to be done. For example, available methods for measuring radionuclides in urine

takes five to 30 days and the few labs that can measure urinary radionuclides process fewer than 20 samples per day.

Dr. Vitko discussed the Integrated Consortium of Laboratory Networks (ICLN). He explained the ICLN identified EPA, DOE, DHHS as the agencies tasked with radiological response and remediation. The ICLN also completed the first assessment of the Nation's laboratory capabilities across the chem/bio-radiological spectrum.

During the first round of questions, Chairman Miller asked about the Nation's current capability to respond to a radiological attack and what gaps existed in that infrastructure. Dr. Griggs, Ms. Tulis, Dr. Hadley, and Dr. Jones stated that with a single attack, the gap between the laboratory capacity and response needs could peak at 9,000 samples a week, with a million samples unprocessed. With multiple attacks, the number would double or even triple depending on the number of attacks. This meant that it would be impossible to tell if people or buildings had been contaminated with or exposed to radiological material. Such uncertainty could lead to large-scale public panic. Witnesses noted that EPA has attempted to build its disaster response infrastructure and DOE has a laboratory infrastructure, but it only maintains what it needs to test its own workers and sites, which is only of limited use during an emergency.

Chairman Miller asked about the impact of the closing of the Environment Measurement Laboratory's Quality Assurance Program (QAP), which assessed the operations at radiochemistry laboratories. Dr. Griggs and Dr. Jones explained that the nationwide assessment of laboratory capacity had actually utilized historic data from the QAP program's laboratory assessments, which was a critical data set.

Chairman Miller asked why the Nation lacked the capacity to respond to a radiological attack and what could be done to fix that gap. Ms. Tulis, Dr. Hadley, and Dr. Griggs explained that effective cleanup operations from previous radiological sites had reduced the need for radiological testing laboratories, so that EPA was almost a victim of its own success. They stated that the demand for laboratory services was not enough to sustain the number of laboratories which would need to be in operation to respond to a major attack. A pilot project in two states is underway to help laboratories enhance their capacity to test environmental samples and also to discover what laboratories would need to do to improve capability nationwide. The goal is to be ready for a major disaster within five years.

***4.3(m)—The Environmental Protection Agency (EPA)
Library Closures: Better Access for a Broader Audience?***

March 13, 2008

Hearing Volume No. 110-85

Background

On Thursday, March 13, 2008, the Honorable Brad Miller (D-NC) presiding, the Subcommittee on Investigations and Oversight

held a hearing on the Environmental Protection Agency's plan to consolidate and modernize its library network and the impacts of their implementation of this plan on EPA employees and the public.

The Environmental Protection Agency (EPA) manages an extensive library system designed to serve the specific needs of its research and regulatory scientists, its enforcement specialists and the interested public. Beginning in 2003, EPA managers began a series of studies of how to consolidate and restructure their library system to reduce costs among its 26 branches.

By the end of FY 2006, seven libraries were closed. The libraries closed included three regional libraries (Dallas, Chicago, Kansas City), a technical library in Edison, NJ associated with the Region two library, a laboratory library in Region three located in Fort Meade, MD, and two libraries located in Washington, D.C. (the headquarters library and the chemical library managed by the Office of Prevention, Pesticides and Toxic Substances (OPPTS)).

Because EPA did not complete work necessary to restructure its library network, the collections previously housed in these libraries are still not fully accessible to EPA employees and the public.

The Subcommittee heard from the following witnesses: 1) Mr. John Stephenson, Director of Natural Resources and Environment for the Government Accountability Office; 2) Mr. Charles Orzechoskie, President, American Federation of Government Employees, Council 238; 3) Dr. Francesca Grifo, Senior Scientist and Director, Scientific Integrity Program for the Union of Concerned Scientists; 4) Mr. Jim Rettig, President-elect, American Library Association; and 5) Ms. Molly O'Neill, Assistant Administrator, Office of Environmental Information (OEI) and Chief Information Officer, Environmental Protection Agency.

Summary of Hearing

Chairman Miller testified on the importance of the EPA libraries. He explained that the most generous possible explanation for the closures was that EPA managers were stunningly incompetent, but it is possible that the explanation is more sinister. The EPA ignored their own careful plans and abruptly closed libraries, limited access to the public and EPA employees, and just threw away documents that may be irreplaceable.

Mr. Stephenson testified on the GAO report released that day on the EPA's library restructuring. The Government Accountability Office (GAO) found that the EPA's effort to close regional and research libraries around the country has been plagued by managerial problems. The report also says that the decision to close libraries was not justified and strongly suggests that the entire process EPA has followed in closing the libraries is flawed and could deprive the public, EPA staff, State and local agencies, and academics with valuable environmental data.

Mr. Orzechoskie, speaking on behalf of almost 9,000 EPA employees, questioned the libraries' closings. He explained that they had been told that the libraries were closed to save the government money, yet EPA's own Office of Environmental Information did a cost-benefit analysis in 2004, which estimated that EPA's library network saved Agency professional staff 214,000 hours, a cost sav-

ing of approximately \$7.5 million. The benefit-to-cost ratio was conservatively estimated at 4.4 to one.

Dr. Grifo explained EPA began to close or reduce access to parts of its network of libraries as part of a modernization plan. This process took items out of circulation before making them available electronically, and did not fully consider how to make the diversity of EPA's library holdings accessible during the transition period and beyond. She suggested restoring librarians to the regions that were closed, and she proposed setting deadlines for the digitization of EPA's documents and for allowing public access to all of the EPA's informational holdings.

Mr. Rettig testified on the importance of the EPA libraries, the potential loss of information, and the necessity of having a staff librarian. He explained that EPA has not reached out to the EPA library user community, the thousands of scientists, researchers, and attorneys who use these resources daily, as well as members of the public, who have benefited greatly from access to these unique collections.

Finally, Ms. O'Neil's testimony focused on the progress EPA is making on strengthening its national library network and ensuring that information is made available to EPA employees and the American public.

During the discussion, Chairman Miller asked what services are currently available to EPA employees. Ms. O'Neill assured him that the materials were still available through online sources and, to her knowledge, nothing was thrown away. Ms. O'Neill also discussed how the libraries were working with librarians and the communities to improve services to the public and EPA employees. Mr. Orzechoskie claimed that library services his region have not been restored.

Ranking Member Hall asked about the EPA's actions since the Senate hearings last year. Ms. O'Neill discussed the EPA's response plan, due March 2008, that they are drafting to present to Congress. Chairman Miller later requested that Ms. O'Neill make time to meet with the other witnesses, share the report with them, and get their feedback.

4.3(n)—Toxic Trailers: Have the Centers for Disease Control Failed to Protect Public Health?

April 1, 2008

Hearing Volume No. 110–88

Background

On Tuesday, April 1, 2008, the Honorable Brad Miller presiding, the Subcommittee on Investigations and Oversight held a hearing on how the Agency for Toxic Substances and Disease Registry's (ATSDR's) a sister agency of the Centers for Disease Control (CDC), failed to protect the public's health after Hurricanes Katrina and Rita.

The agency failed to translate scientific findings and facts into appropriate public health actions which would have resulted in properly informing and warning tens of thousands of Hurricanes Katrina and Rita survivors living in FEMA-provided trailers and

mobile homes of the potential health risks they faced. Instead of pushing to have the residents removed immediately, the agency did virtually nothing.

The hearing examined the direct involvement of the Director and Deputy Director of ATSDR in reviewing, vetting and approving the release of the agency's February 2007 Health Consultation on formaldehyde which was scientifically unsound and quickly dismissed by the agency's chief toxicologist after it had been forwarded to FEMA. Dr. Christopher De Rosa, ATSDR's chief toxicologist and then-Director of the Division of Toxicology and Environmental Medicine, immediately drafted a swift, sharp letter to FEMA pointing out many of the scientific faults with the report and said to release it as it was would be "perhaps misleading." The Director of ATSDR finally had the letter sent to Mr. Rick Preston from FEMA's Office of General Counsel, who had requested the report in the first place, from a separate ATSDR office on March 17, 2007. Amazingly, Mr. Preston acknowledged in interviews with Subcommittee staff that he simply placed the letter in a file drawer and never shared it with anyone else.

Without knowledge of the March letter, the February Health Consultation by itself led senior FEMA officials to believe that concentrations of formaldehyde in FEMA-provided temporary housing units did not present a public health hazard. That interpretation of ATSDR's Health Consultation and the astonishingly lackluster effort by ATSDR officials to correct public mis-statements by FEMA officials or to immediately revise their own flawed report in the Spring of 2007 led FEMA to maintain the status quo and keep tens of thousands of Hurricane Katrina and Rita survivors living in potentially formaldehyde-laden toxic trailers for at least one year longer than necessary or warranted. Apart from the March 17th letter ATSDR had no response at all. If they had, perhaps more than 30,000 families would not remain in these temporary housing units today.

The first panel included: (1) Dr. Heidi Sinclair, Assistant Professor of Pediatrics at Louisiana State University and the Medical Director with Baton Rouge Children's Health Program; (2) Mrs. Lindsay Huckabee, a resident of a FEMA-provided mobile home in Kiln, Mississippi from October 2005-to-present; and (3) Ms. Becky Gillette, the Formaldehyde Campaign Director, Sierra Club Gulf Coast Environmental Restoration Task Force.

The second panel included: (1) Dr. Christopher DeRosa, former Director of the Division of Toxicology and Environment Medicine, Agency for Toxic Substances and Disease Registry; and (2) Dr. Meryl Karol, Professor Emerita, Department of Environmental & Occupational Health, University of Pittsburgh.

The third panel included: (1) Dr. Howard Frumkin, Director, Agency for Toxic Substances and Disease Registry and National Center for Environmental Health, (NCEH); (2) Dr. Tom Sinks, Deputy Director, Agency for Toxic Substances and Disease Registry and National Center for Environmental Health; and (3) Vice Admiral Harvey E. Johnson, Jr. (ret.), Deputy Administrator, Federal Emergency Management Agency (FEMA).

Summary of Hearing

During the first panel, Dr. Sinclair discussed her experience as a pediatrician for patients who were exposed to formaldehyde in FEMA trailers. Mrs. Huckabee provided testimony on her family's experiences and health problems while living in a mobile home provided by FEMA over the past two years. She also discussed FEMA's and the CDC's failure to address her concerns over the formaldehyde levels in her trailer. Ms. Gillette testified on the Sierra Club's efforts to ensure that FEMA and ATSDR were aware of the many health problems associated with the formaldehyde in the trailers and how the Sierra Club was ignored.

Chairman Miller began by questioning Ms. Gillette about her experiences with ATSDR and FEMA. Ms. Gillette indicated that she had never heard back from ATSDR about her health test results. Dr. Sinclair suggested tracking the trailer residents in order to monitor the extent of the health effects and to assist them in the future. Dr. Sinclair said that long-term reproductive health effects of formaldehyde were unknown.

During the second panel, Dr. Meryl Karol disagreed with the ATSDR's recommendations to use 0.3 ppm as their level of concern. She stated that the level should not be above 0.1 ppm. Dr. Chris De Rosa testified on his efforts to ensure that ATSDR adequately respond to the public health issues facing the residents exposed to formaldehyde.

Chairman Miller asked about ATSDR's process for reviewing reports. Dr. De Rosa discussed ATSDR's review process for reports, specifically for the February 1, 2007 report. Dr. De Rosa and Dr. Karol both felt that people should be tracked over time to ensure that there are no long-term health effects. Chairman Miller also asked Dr. Karol about the February 2007 health consultation. She noted that the report did not address long-term health effects.

Dr. Frumkin and Dr. Sinks provided joint testimony on the ATSDR's role in the investigation of formaldehyde in FEMA trailers and that in retrospect they did not respond as aggressively as they should have. Vice Admiral Johnson provided testimony on the steps that FEMA has taken and will be taking to get residents out of trailers and ensure their safety.

During the discussion, Dr. Frumkin answered a series of questions about his involvement with the February 2007 Health Assessment. Both Dr. Sinks and Dr. Frumkin commented on the process by which that document was reviewed and how Dr. De Rosa was excluded from the review process. They discussed a March 9 letter from Dr. De Rosa, which included the concern that long-term health impacts were not addressed. Dr. Sinks and Dr. Frumkin indicated that despite numerous e-mails and documents about the involvement of FEMA lawyers, they had not realized that lawyers from FEMA had requested the consultation. Rep. Lampson (D-TX) asked Dr. Frumkin to elaborate on specific changes being made to prevent a recurrence of their failures in the FEMA health consultation. Dr. Sinks and Dr. Frumkin discussed Dr. De Rosa's performance, and indicated that they had no intentions of threatening his employment.

In addition, Vice Admiral Johnson explained that FEMA requested a short-term health consultation because they were more

focused on mitigation of formaldehyde in the trailers. He went through the costs, FEMA inventory, and sale of travel trailers and explained that flyers had been distributed to trailer residents to warn them about harmful health effects of formaldehyde. Rep. Lampson (D–TX) asked several questions regarding plans to test mobile homes at Maxwell Air Force Base, to which Vice Admiral Johnson acknowledged that more testing had been planned.

In closing, Chairman Miller cited the suffering of thousands of Katrina victims who suffered due to the formaldehyde in FEMA trailers, and expressed regret that FEMA, the Agency for Toxic Substances and Disease Registry (ATSDR), and the Center for Disease Control (CDC) were not able to rely upon a current health assessment of formaldehyde. As all the witnesses had agreed, he saw no virtue in not knowing, and finding out quickly, chemical health risks.

***4.3(o)—EPA’s Restructured IRIS System: Have
Polluters and Politics Overwhelmed Science?***

May 21, 2008

Hearing Volume No. 110–104

Background

On Wednesday, May 21, 2008, the Honorable Brad Miller (D–NC) presiding, the Subcommittee on Investigations and Oversight held a hearing to discuss the Integrated Risk Information System (IRIS), a database established in the 1980s to provide a single source of information on the risks associated with exposure to chemicals. The IRIS database provides a hazard identification and dose-response analysis, scientific information that when combined with estimates of exposure allow regulatory agencies to produce a risk assessment. A new risk assessment review process was put in place for IRIS updates on April 10, 2008, which will drastically slow down the time review process and give polluting agencies even more opportunity to slow the IRIS process and avoid the consequences of an accurate reporting of the risks of chemicals.

The first panel included: (1) Mr. John Stephenson, Director of Natural Resources Environment, Government Accountability Office. The second panel included: (2) Dr. George Gray, Assistant Administrator for Research and Development of the United States Environmental Protection Agency; and (3) Ms. Susan Dudley, Administrator for the Office of Information and Regulatory Affairs (OIRA) of the Office of Management and Budget (OMB).

Summary of Hearing

In his opening statement, Chairman Miller explained that as a result of OMB’s control of IRIS evaluation procedures, four chemicals have been listed on IRIS in the last two fiscal years. EPA scientists produced 15 or so assessments in each of these years, but the assessments disappeared into an abyss of elaborate, endless reviews, mostly behind closed doors. The system is fundamentally broken and cries out for reform.

Mr. Stephenson discussed GAO’s recent report on the new changes, entitled “Chemical Assessments: Low Productivity and

New Interagency Review Process Limit the Usefulness and Credibility of EPA's Integrated Risk Information System." He explained that the new changes to the IRIS process are unacceptable, threaten to make IRIS' database obsolete, and that EPA efforts to improve the process have been ineffective. He worried about process transparency and suggested legislative action might be necessary to fix IRIS' problems, particularly in light of its failures to regulate chemicals such as trichloroethylene (TCE).

During the discussion, Mr. Stephenson agreed with Chairman Miller that the new EPA process is more complicated than the old, despite anticipated arguments from the second witness panel. Rep. Reichert (R-WA) and Rep. Baird (D-WA) both asked how the process can balance the competing priorities of timeliness and thoroughness. Mr. Stephenson agreed that it was always a difficulty; in this situation, timeliness was often defeated because there were no schedules imposed. He stressed, however, that EPA independence is a crucial element in improving its productivity. He also noted that the new IRIS process' lack of transparency allowed more agencies with conflicts of interest to weigh in on risk assessment.

During the second panel, Dr. Gray argued that the new IRIS process is more streamlined, efficient, and transparent than the old process. He claimed this would be proven once EPA had a chance to implement and evaluate the new process.

Ms. Dudley defended the OMB's involvement with IRIS by pointing to its support for large increases in funding, and explained that interagency coordination allows EPA to take advantage of more broad scientific expertise.

During the question and answer period, Mr. Stephenson rejoined the panel. Ms. Dudley objected to Mr. Stephenson's statement that OMB reviewed EPA's response to the GAO report. Chairman Miller asked Ms. Dudley if the role of the OMB was to review other agencies' scientific assessments, and she responded that the OMB serves a coordinating function; thus, its scientists should be allowed to arrange such reviews. She also explained that OIRA does not perform scientific analysis itself, but coordinates other agencies to perform analysis, none of which are non-Federal agencies. Chairman Miller showed Dr. Gray and Ms. Dudley the pre- and post-IRIS reform charts, those detailing the review process, and they confirmed that the charts accurately represented the organizational changes, albeit without timelines on the post-reform version.

Rep. Rohrabacher (R-CA) asked Dr. Gray about the charts once again, and Dr. Gray declined to take responsibility or fully endorse their accuracy. He then decided that the latest post-reform diagrams did reflect the process as it is currently defined. Rep. Rohrabacher prompted Dr. Gray to establish that the post-reform diagram, while it looked more complex than the pre-reform diagram, in fact represented a simpler, more efficient, more transparent process.

Witnesses Gray and Dudley then described several steps of the review process individually at the request of Chairman Miller. In a discussion on transparency, Ms. Dudley asserted that some closed-door deliberation and discussion is necessary for frank interagency discussions. Mr. Stephenson asserted that he could not understand this reasoning. Rep. Miller asked if OMB ever conducted

deliberative discussions with private chemical manufacturers, and Ms. Dudley said that it did not.

Chairman Miller asked when the purported increase in efficiency would prove itself, and Dr. Gray explained that it would take some time to get used to the changes, and that the EPA should be aggressive about implementing them. Dr. Gray and Ms. Dudley expressed their confidence in the newly established review timelines, but Mr. Stephenson worried that there were crucial timelines missing from the plan, and that the total review process could still take up to six years under the new restrictions.

4.3(p)—*American Decline or Renewal? Part I—Globalizing Jobs and Technology*

May 22, 2008

Hearing Volume No. 110–105

Background

On Thursday, May 22, 2008, the Honorable Brad Miller (D–NC) presiding, the Subcommittee on Investigations and Oversight held a hearing to assess the effects of the globalization of jobs and technology on the American economy, and to develop an understanding of the incentives and disincentives that influence United States firms' decisions to locate at home or abroad. Firms' thinking both on whether to retain or to offshore existing U.S.-based capacity and on where to locate new investment was explored.

The witnesses were arranged on two panels. The first included: (1) Dr. Ralph E. Gomory, Research Professor, NYU Stern School of Business, Henry Kaufman Management Center; (2) Dr. Margaret Blair, Professor of Law, Vanderbilt University Law School; and (3) Dr. Bruce R. Scott, Paul Wharton Cherington Professor of Business Administration, Harvard Business School. The second panel included: (4) Mr. James R. Copland III, Chairman, Copland Fabrics, Burlington N.C.; (5) Mr. Brian O'Shaughnessy, Chairman, Revere Copper Products, Inc., Rome, N.Y.; and (6) Mr. Wes Jurey, President & CEO, Arlington Chamber of Commerce, Arlington, T.X.

Summary of Hearing

In his opening statement Chairman Miller asserted that the Committee's jurisdiction gave them broad authority to discuss the needs of American business and economic competitiveness. He explained that the first panel would discuss economic models and the effect of the world trading system on Americans and the second panel would discuss both the struggles faced by many manufacturers to keep production domestic as well as the lures of offshore production.

Full Committee Ranking Member Hall (R–TX) offered opening remarks in Subcommittee Ranking Member Sensenbrenner's place. He commented on the importance of STEM education and Federal Research and Development Projects as they relate to the larger issues of globalization and American economic advancement.

Dr. Gomory and Dr. Blair highlighted how globalization has led to divergent interests between countries and corporations. Dr. Gomory specifically cited lack of corporate responsibility to employ-

ees and communities and profit driven business leaders as a major part of the problem. All panelists suggested potential solutions to these issues including increasing business regulation in order to alleviate pressure to drive up share prices and maximize profits and rewarding companies for having high value-add jobs.

During the question and answer period, the witnesses discussed corporate executive accountability and potential solutions for making them more answerable to their shareholders and local communities. One suggestion was changing the way executives are compensated so they are less concerned with the bottom line by restricting stock options or giving tax benefits to companies as a reward. The panel also addressed the possibility of giving the shareholders more control over the company and its stocks. Finally, the panel discussed the role of pension and hedge funds in governing and controlling corporate actions and economic choices.

All three witnesses on the second panel asserted that in today's economy it is very difficult for American companies to compete with other nations who do not have the same quality standards and safety regulations. Mr. O'Saughnessy specifically cited the lack of a national economic policy as a government shortcoming. He and Mr. Jurey agreed that the U.S. must reform the tax system to reward companies for domestic production. Additionally, all the witnesses highlighted the importance of redeveloping a skilled American workforce and providing individuals with the tools and opportunities they need to make domestic production successful.

During the question and answer period, many of these same concerns were reasserted in greater detail. China was a major point of discussion, including its government subsidies of production and American companies' inability to compete on such an unbalanced playing field. They also further addressed the need for a domestic economic policy and uniform international policy. Two additional major points were creating tax benefits and increasing government regulation. Finally, the panel asserted that community colleges and other educational institutions play a pivotal role in boosting the skilled workforce and increasing domestic production.

4.3(q)—Toxic Communities: How EPA's IRIS Program Fails the Public

June 12, 2008

Hearing Volume No. 110-108

Background

On Thursday, June 12, 2008, the Honorable Brad Miller (D-NC) presiding, the Subcommittee on Investigations and Oversight met to examine the shortcomings of the Environmental Protection Agency's Integrated Risk Information System Program, which is responsible for assessing and regulating chemical pollutants in order to protect public health. The Members and witnesses discussed IRIS's slow pace in assessing chemicals and providing the public with information, citing bureaucratic failures for the difficulties, and considered possibilities for improvement.

The Subcommittee heard from the following witnesses: (1) Mr. Jerome Ensminger, Master Sergeant U.S. Marine Corps (ret.); (2)

Mr. Lenny Seigel, Center for Public Environmental Oversight; and (3) Dr. Linda Greer, Senior Scientist at the Natural Resources Defense Council.

Summary of Hearing

In his opening statement, Chairman Miller explained that the glacial pace at which EPA is completing assessments of chemicals has real consequences for public health and tragic consequences for individuals and their families. Dogged attention to scientific detail and the intrusion of politics have overcome the primary goal of protecting public health.

Ranking Member Sensenbrenner (R-WI) added that IRIS was originally developed for the task of establishing a uniform toxicity database within the EPA, but has since splintered into an authoritative resource for many other agencies, limiting its effectiveness. He called for the EPA to limit assessment timeframes, perhaps by giving more notice of its assessments to interested parties.

Master Sergeant Ensminger discussed his personal experience with environmental toxins at Camp Lejeune, North Carolina. He gave the details of Lejeune's contamination and told the tragic story of his daughter's struggle with acute lymphocytic leukemia as the result of toxic exposure. He criticized the Navy and Department of Defense for consistently ignoring the recommendations of the Agency for Toxic Substances and Disease Registry (ASTDR) and endangering military families.

Mr. Siegel judged that the EPA's new IRIS process, announced in April, merely institutionalizes a deeply flawed and risky approach to protecting public health, pointing to specific incidences of human trichloroethylene exposure. He recommended more public access to the decision-making process, limiting conflicts of interest in risk-relevant research funding, and a public process of assessing hazardous materials.

Dr. Greer testified on the lack of attention to public health and science from the Bush Administration, pointing to its recent changes to the IRIS program that delays action and allows polluting agents more freedom to harm the environment.

The question and answer period focused on transparency and accountability of IRIS decision-making and what kind of oversight would be necessary to improve IRIS' current situation. Mr. Siegel confirmed that the citizen groups had little opportunity for public comment on IRIS efforts. Mr. Miller asked whether federal agencies could weigh in on an IRIS assessment, along with public comments, and Dr. Greer replied that it was certainly possible. Mr. Siegel expressed concerns that polluting agencies mislead the public. Sergeant Ensminger weighed in on the government's efforts to identify those exposed to dangerous toxins, saying they were stubbornly insufficient. Mr. Siegel then pointed out that one difficulty in health risk management is that cumulative chemical exposures are what cause health problems, so that the same amount of exposure can be more dangerous for certain at-risk populations. Ms. Greer explained that IRIS' problems are both policy and science-related; the overall keys to success are consistency, achieving objective, clear and health-protective decisions, and increasing public access to information. The witnesses agreed that another priority is

establishing clearer links between exposures and particular diseases. They also agreed that ATSDR and the IRIS program have consistently failed the public and are in dire need of process reform.

4.3(r)—*American Decline or Renewal? Part 2—The Past and Future of Skilled Work*

June 24, 2008

Hearing Volume No. 110–111

Background

On Tuesday, June 24, 2008, the Honorable Brad Miller (D–NC) presiding, the Subcommittee on Investigations and Oversight held a hearing entitled “*American Decline or Renewal? Part 2—The Past and Future of Skilled Work.*” The hearing surveyed the efficacy of past and current efforts to aid dislocated workers and communities, as manufacturing and skilled labor has been deeply affected by globalization. The Members and witnesses also assessed the structure of international trade in order to predict how well domestic efforts at retraining and reinvestment can be expected to succeed in the future.

The witnesses included: (1) Dr. John Russo, Co-Director, the Center for Working-Class Studies and Coordinator, the Labor Studies Program, the Warren G. Williamson School of Business Administration, Youngstown State University; (2) Mr. Frank H. Morgan, Attorney, White & Case LLP; (3) Mr. Howard F. Rosen, Executive Director, Trade Adjustment Assistance Coalition and visiting fellow, the Peterson Institute for International Economics; (4) Ms. Jeanie Moore, Vice president, Continuing Education Programs, Rowan-Cabarrus Community College; (5) Dr. Thomas I. Palley, Founder, Economics for Democratic & Open Societies Project; and (6) Ms. Diana Furchtgott-Roth, Director, Center for Employment Policy and senior fellow, The Hudson Institute.

Summary of Hearing

Chairman Miller opened the discussion citing high American debt and low consumer confidence, calling for another look at familiar economic assessment formulas. Ranking Member Sensenbrenner (R–WI) voiced a complaint about the Majority having hired an outside consultant to examine globalization issues.

Dr. Russo gave testimony on and offered solutions to de-industrialization and its impact on local communities such as Youngstown, Ohio, pointing to feelings of identity loss and betrayal among laborers and their families.

Mr. Morgan criticized the Department of Labor for its failures investigating and responding to the Trade Adjustment Assistance (TAA) program petitioners’ cases.

Mr. Rosen cited problems of unemployment insurance and inflexibility in assistance services, and he emphasized the need for economic and labor infrastructure to catch up with economic reality.

Ms. Moore shared her story of the Kannapolis, North Carolina community, promoting the need for adult education.

Mr. Palley expressed concern that globalization, or “barge economics,” undermines earlier policy tools and threatens dissolution of the social contract that promotes shared prosperity.

Ms. Furthgott-Roth defended globalization in part for its promotion of lower-cost consumer goods, but suggested administrative simplicity, skill-flexible worker training plans, and community colleges as means to improving the TAA.

In the discussion portion of the hearing, the Members and witnesses focused on the issues of displaced workers, corporate responsibility, and the problem of international competition promoting a “lowest common denominator” in environmental standards, labor pay, etc. Dr. Palley asserted that the goal of globalization should be shared prosperity, and called for higher international labor standards, environmental standards, and tax incentives for companies that increase value-added production domestically. In addition, Mr. Rosen called for more domestic investment. Ms. Furthgott-Roth argued that American quality of life is better due to globalization, but called for energy reform and passage of the Columbia Free Trade Agreement. The witnesses conceded that offshoring American corporations are often victims of unfair competition themselves, “forced” to move operations to remain financially viable. The Members and witnesses ultimately agreed that adult education and aid programs such as the TAA needed to be more widely used, easier for possible participants to use and understand, and more sensitive to the difficulties of displaced workers.

4.3(s)—Biobanking: How the Lack of a Coherent Policy Allowed the Veterans Administration to Destroy an Irreplaceable Collection of Legionella Samples

September 9, 2008

Hearing Volume No. 110–120

Background

On Tuesday, September 9, 2008, the Honorable Brad Miller (D-NC) presiding, the Subcommittee on Investigations and Oversight held a hearing to make public the findings of the Subcommittee investigation on the destruction of one of the world’s leading collections of *Legionella* disease at the Veterans Administration (VA) Pittsburgh Health Service in December 2006. The collection represented the life’s work of two top experts on *Legionella* and hospital infections, Dr. Victor Yu and Dr. Janet Stout. Its destruction brought condemnation of the Veterans Administration from biomedical researchers, and raises important policy questions regarding the protection of biomedical sample collections built with federal support.

There were three witness panels. On the first: (1) Dr. Victor Yu, Professor of Medicine, University of Pittsburgh; (2) Dr. Janet Stout, Director, Special Pathogens Laboratory; and (3) Dr. David Snydman, Chief, Division of Geographic Medicine and Infectious Diseases, and Attending Physician in Infectious Diseases, Department of Medicine, Tufts Medical Center.

On the second: (4) Dr. Jim Vaught, Deputy Director, Office of Biorepositories and Biospecimen Research, National Cancer Insti-

tute (NCI); (5) Dr. Janet K.A. Nicholson, Senior Advisor for Laboratory Science, Coordinating Center for Infectious Diseases, Centers for Disease Control and Prevention (CDC); and (6) Mr. Michael Moreland, Director, Veterans Integrated Services Network 4, Department of Veterans Affairs.

On the third: (7) Dr. Mona Melhem, Associate Chief of Staff and Vice President, VAPHS Clinical Support Service Line; (8) Dr. Ali Sonel, VAPHS Associate Chief of Staff (Research); (9) Dr. Steven Graham, Director, VAPHS Geriatric Research, Education and Clinical Centers; and (10) Ms. Cheryl Wanzie, VAPHS Chief Technologist.

Summary of Hearing

Chairman Miller was shocked that a federal health agency official would unilaterally order the destruction of a human tissue collection without receiving the approval of the agency's research office and the Research Compliance Committee. He went on to say that he could not imagine why that official would, apparently, make false statements during the destruction to keep the associate director for research at the Center in the dark until the destruction was complete, and further stunned that neither Pittsburgh nor national VA officials took formal action to discipline the managers involved in this case.

The first panel of witnesses included Drs. Stout and Yu, whose work was destroyed, and Dr. Snyderman, who is also a researcher in the field. Dr. Stout discussed the data set and its value to the identification of legionnaire's disease and research on the topic. Dr. Yu then explained the events leading up to the destruction of the specimens, including the sudden mass firing of the research staff. Dr. Snyderman testified on the collection and storage of the samples.

During the discussion, Chairman Miller asked about how the samples were stored. Dr. Snyderman answered that this system was very standard and not disorganized. Dr. Stout showed a visual representation of the system. The witnesses all agreed that proper cataloging was critical to research and that the samples were properly cataloged. Drs. Stout and Yu informed the Chairman that they had never been notified or contacted with the information that the sample storage system was considered improper or hazardous.

During the second panel, Dr. Vaught explained the system of sample management at the National Cancer Institute (NCI) and National Institute of Health (NIH) in general.

Similarly, Dr. Nicholson testified on the protocols and regulations of the Centers for Disease Control (CDC) sample collection and storage system.

During the discussion, Chairman Miller asked both witnesses if the incident could have occurred at their respective institutions. They responded that the procedures for sample disposal are very complicated, and it would not be possible to simply throw away samples. Dr. Vaught cautioned that while the NIH system is very effective, it cannot be uniformly applied to all scientific collections, such as the NASA space rock collection, which may have unique management requirements.

Rep. Rohrabacher (R-CA) asked whether the VA should have been performing this research in the first place, as opposed to the

CDC or NIH. Dr. Nicholson responded that there is a *Legionella* lab at CDC, but as a non-expert, she couldn't say whether or not this lab could have encompassed the work of Drs. Stout and Yu. Similarly, Dr. Vaught could not say whether NIH would incorporate the same research.

Rep. Broun (R-GA) asked both witnesses if they saw any compelling reasons to destroy the samples. Dr. Vaught responded that he did not know enough of the facts to answer, and Dr. Nicholson agreed, adding that it is not uncommon to destroy specimens at CDC.

The third panel included witnesses from the Veteran's Affairs Pittsburgh Healthcare System. Mr. Moreland oversaw the decision to close the SPL and instituted a Board of Investigation to examine allegations of financial impropriety against Dr. Yu. Mr. Moreland testified that the samples which were destroyed were either unlabeled, or improperly labeled and were considered biohazardous materials. Only Mr. Moreland submitted written testimony, the panel did not submit written testimonies in advance, but read prepared statements stating that the samples were biohazards, the lab had retained property rights over those samples, and therefore was able to follow protocol to destroy the improperly labeled samples.

Chairman Miller asked the witnesses about the destruction of the samples. The panel responded that the lab had not provided the catalog which referenced the vials, and therefore they could not identify the contents. Mr. Miller then asked the panel to evaluate the conflicting information on the quality of the vials destroyed. Ms. Melhem responded that she thought they were clinical samples, not research samples because of the type of labeling system used. Without cooperation from the lab staff, she argued, she could not tell that they were research, and not clinical, samples.

4.4—SUBCOMMITTEE ON RESEARCH AND SCIENCE EDUCATION

4.4(a)—Improving the Laboratory Experience for America's High School Students

March 8, 2007

Hearing Volume No. 110-9

Background

On March 8, 2007, the Subcommittee on Research and Science Education held a hearing to examine how Congress could help improve the laboratory experience for America's high school students. The four witnesses were: (1) the Honorable Ruben Hinojosa, Representative from the 15th District of the State of Texas; (2) Dr. Arthur Eisenkraft, Distinguished Professor of Science Education at the University of Massachusetts, Boston; (3) Ms. Linda Froschauer, President of the National Science Teachers' Association; and (4) Dr. Jerry Mundell, Professor of Chemistry of Cleveland State University.

Summary of Hearing

Chairman Baird welcomed Congressman Hinojosa and praised Mr. Hinojosa's bill, H.R. 524, which authorized NSF to make matching grants between high schools and other institutions to improve science labs for students. He cited the National Academy of Sciences report, *"America's Lab Report: Investigation in High School Science,"* as evidence of the need to improve existing facilities and equipment, to increase the training and preparation of teachers, and to focus laboratory exercises on current curriculum. Mr. Baird declared that the one of the major priorities of his subcommittee would be to improve K-12 science education.

Ranking Member Ehlers emphasized that science, technology, engineering and mathematics (STEM) education in America is a fundamental necessity. Mr. Ehlers also stated that it was unfortunate that America is behind many other nations in this area. He expressed concern that educators and researchers cannot even agree on the definition of laboratory science and that more research was needed on how to establish a successful laboratory. He cited Nobel Laureate Carl Wieman's research on creating science education materials that stimulate both teachers and students and suggested that his research should be expanded upon.

Mr. Hinojosa discussed the Partnerships for Laboratory Science Act, H.R. 524, and why it is important. Mr. Hinojosa spent considerable time describing how the South Texas area had been neglected for many years, but the area had invested in human capital and the investments were starting to pay off in high schools in the

South Texas Independent School District. Mr. Hinojosa drew attention to two findings of the National Academy of Sciences regarding America's high school labs:

- laboratory experiences for most students are poor, and there is no definition of a high school laboratory agreed upon by educators and researchers; and
- high schools that have high concentrations of non-Asian minorities and schools with higher concentrations of poor students are more likely to not have sufficient laboratory facilities compared to other schools.

Dr. Eisenkraft served on the NAS panel that produced the report on high school lab experiences and he provided a summary of the findings and conclusions of the report. He explained that the NAS report already cited included a definition of laboratory experiences. He stated that H.R. 524 was trying to resolve two of the conclusions from the NAS report that were emphasized by Mr. Hinojosa (see above). Dr. Eisenkraft declared that there is no tape or book that could take the place of actual lab experience but that none of this will occur until society itself accepts this as a worthy goal.

Ms. Froschauer declared that the National Science Teachers Association strongly supports H.R. 524 and the Partnerships for Access to Laboratory Science (PALS) grants. Ms. Froschauer cited a 1995 GAO report that declared that about 42 percent of all high school labs surveyed were not well equipped for laboratory science. She also cited a 2005 GAO report that found that 40 percent of students listed their high school science experience as the reason for not being adequately prepared for their science experiences in college. Ms. Froschauer concluded her testimony by reading several letters from actual teachers that listed numerous shortcomings in today's high school labs. She stated that all of the letters pointed out to the dire necessity of H.R. 524 to become public law.

Mr. Mundell discussed the findings from a survey that he conducted of his chemistry class students' high school experiences. Of the students surveyed (66 total), only 33 percent agreed that the lab portion in high school stimulated their interest in chemistry and only 21 percent agreed that their high school chemistry lab sufficiently prepared them for their college chemistry course. Mr. Mundell stated that today's high school labs do not inspire high school students to actively pursue science. He added that traditional high school lab exercises should be replaced with exploration and discovery. He described the Research Experience to Enhance Program at CSU, funded by NSF, as an ideal prototype to replace today's high school labs. He supported H.R. 524 as a means to inspire students and to create real life chemistry experiments.

**4.4(b)—National Science Foundation
Reauthorization: Part I**

March 20, 2007

Hearing Volume No. 110–13

Background

On March 20, 2007, the Honorable Brian Baird presiding, the Subcommittee on Research and Science Education held the first hearing to receive testimony from the Director of the National Science Foundation (NSF) and the Chair of the National Science Board (NSB) regarding pending legislation to reauthorize core activities, amend administrative laws and set new policy directions for NSF. The witnesses were Dr. Arden L. Bement, Jr., Director of the National Science Foundation and Dr. Steven C. Beering, Chairman of the National.

Summary of Hearing

Chairman Baird opened by stating support new researchers is crucial and should be increased. For this reason the Committee is considering creating a pilot program of seed grants to young investigators to give them opportunities for success. He also discussed the industry's role in funding basic research. He expressed great concern for the shrinking budget of STEM education programs at NSF. He noted that the Research and Science Education Subcommittee supports the Administration's proposal to double funding for basic science research over a 10-year period.

He placed great emphasis on quality research because of the poor economy. He questioned the witnesses on what needs to be done to nurture young investigators and improve their funding rates. He wanted them to distinguish between interdisciplinary and disciplinary research. He was concerned with the NSF's role in research by national needs as well as the NSF's priorities in K–16 and STEM. He welcomed suggestions and ideas from the witnesses.

Dr. Bement discussed his CAREER award which supports the career-development of young investors. He distinguished between interdisciplinary and disciplinary research. He noted that NSF supports interdisciplinary research because of the opportunity for innovation. Many methods of interdisciplinary research were discussed such as: mail reviews, panel reviews, and the Task Force on Transformative Research. He detailed the NSF's attention to issues of national importance. He continuously emphasized grants to young investigators/students to help with the educational process.

Dr. Beering responded to Chairman Baird's question of how to deal with young investigators by detailing a prior report that called for \$1 billion in grants over a five-year period and \$200 million to fund an expansion. He commented that expanding research will open doors for young investigators. He also supports the Career program mentioned previously by Dr. Bement. In regards to the NSF funding for interdisciplinary research, he stressed the importance of keeping the research from becoming disadvantaged. He declared that NSF's mission is defined in terms of national needs. He mentioned the NSF's growing interagency partnerships. Finally, he

detailed the NSF's priorities in K–16 science, technology, engineering and mathematics. STEM education was one of his top objectives.

**4.4(c)—National Science Foundation
Reauthorization: Part II**

March 29, 2007

Hearing Volume No. 110–19

Background

On March 29, 2007 the Honorable Brian Baird presiding, the Subcommittee on Research and Science Education held a second hearing to discuss pending legislation with the various stakeholders in the scientific and technical community.

The witnesses included (1) Dr. Catherine T. Hunt President of American Chemical Society, (2) Dr. Phyllis M. Wise Provost, University of Washington, (3) Dr. Margaret L. Ford President Houston Community College System–Northeast, (4) Dr. Carlos A. Meriles, Assistant Professor of Physics, City College of New York and (5) Dr. Jeffrey J. Welser, Director of the Nanoelectronics Research Initiative Semiconductor Research Corporation.

Summary of Hearing

Chairman Baird opened by noting the first hearing themes of NSF's prestigious award CAREER, NSF's role in STEM education, and the important distinction between interdisciplinary and disciplinary research.

Dr. Hunt was questioned by Chairman Baird about the role of NSF and in supporting young minds. She stated that funding was much needed, and research and education are inseparable. She stated that the educational system and STEM must find new methods to train struggling teachers, outfit better laboratories and promote careers in science to young minds. One of her solutions was increased grants to capture more researchers at early stages of their careers. Another solution mentioned was broadening the background of NSF's various review panels, advisory boards, and program officers. She commented that the NSF's budget is relatively flat and described the need for funding for STEM without depriving other organizations.

Dr. Phyllis emphasized opportunities for junior researchers as well as the STEM enterprise system. He mentioned the IGERT program which funds graduate students. He stressed that research instrumentation programs need to increase. He asked for the NSF to sponsor his program.

Dr. Ford reminded listeners that community colleges are crucial to educating the Nation's technical workforce, which increases the amount of students in STEM. She outlined that a large percentage of teachers complete some of their STEM course work at community colleges, which is a valuable component of the educational process.

Dr. Meriles discussed his role at City College of New York and the NSF's support and funding of the institution. He outlined how his research nurtured young scientists through awards, helped

catalyze cutting-edge research through cross-disciplinary teams, and effectively integrated academic and industry activities. He discussed the significance of the Faculty Early Career Development Program in supporting young scholars. He also detailed the importance of scholarly research and industry application. He believes Federal Government should provide greater incentives through tax policies and NSF ought to encourage internships.

Dr. Welser expanded on the need for a new computing switch to keep the U.S. as the leaders in microelectronics technology. According to Dr. Welser U.S. leadership in microelectronics technology has great benefits to American businesses. He pushed multi-disciplinary research, multi-year programs and industrial consortia.

**4.4(d)—Federal STEM Education Programs:
Educators' Perspectives**

May 15, 2007

Hearing Volume No. 110-28

Background

On Tuesday, May 15, 2007, the Subcommittee on Research and Science Education held a hearing to learn about educators' experiences working with science, technology, engineering, and math (STEM) education programs for K-16 students supported by federal R&D mission agencies. The Subcommittee explored whether such issues as the lack of coordination between the agencies, difficulties for educators to find information about the programs, and the absence of robust evaluation techniques hinder the potential of the federal programs to improve STEM education in America. Most importantly, the hearing highlighted how the federal R&D mission agencies can best contribute to raising the level of scientific literacy of all students.

There were five witnesses: (1) Ms. Linda Froschauer, President, National Science Teachers Association; (2) Mr. Michael Lach, Director of Mathematics and Science, Chicago Public Schools; (3) Dr. George D. Nelson, Director, Science, Technology, and Mathematics Education, Western Washington University; (4) Mr. Van Reiner, President, Maryland Science Center; and (5) Dr. Iris Weiss, President, Horizon Research, Inc.

Summary of Hearing

Chairman Baird opened the hearing by quoting a section out of the National Academies' *Rising Above the Gathering Storm* report that "the scientific and technological building blocks critical to our economic leadership are eroding at a time when many other nations are gathering strength." Mr. Baird stated that the discussion and witness testimony, part of the Committee's ongoing discussion of STEM education, would examine the role of federal R&D agencies in improving STEM.

Ranking Member Ehlers stated that he was looking forward to feedback from witnesses that experience the end product of legislation. He voiced concern that many of the programs authorized by Congress and initiated by federal agencies overlapped and needed to be reassessed. Mr. Ehlers noted his interest in hearing about the

Federal Science and Technology Workforce and Facilities and under-used K–16 resources, as outlined in several witnesses' testimony.

Ms. Froschauer focused on federal STEM education programs for K–12 teachers. She stated that while NIH and NASA provided educational opportunities at the National Science Teachers Association (NSTA) Conference last year, many teachers still do not have access to federal education programs. However, the NSTA was working with NASA, NOAA, and the FDA to develop personal and on-line programs to rectify this issue. She argued that federal agencies' STEM programs need to be better coordinated, ideally by an oversight entity, so that efforts are not duplicated and new ideas can be explored.

Mr. Lach described the Chicago Math and Science Initiative, which improved the performance of mathematics and science education by coordinating resources through a combination of content-rich professional development for teachers, partnerships with local businesses, museums, labs, and universities and enhanced after-school offerings. Partnerships between schools and outside entities, he explained, require constant communication and extensive flexibility. He stated that the federal agencies had two great assets to further STEM education: the best and brightest scientists and engineers and top-notch scientific facilities. The human capital and facilities of the Federal Government could be leveraged to educate and inspire students and teachers.

Mr. Nelson suggested that the federal mission agencies could improve STEM education by focusing on literacy and workforce development; employing skilled and knowledgeable engineers and scientists; developing partnerships between industry, the federal agencies and universities; and comprehending the structure of K–12 education while developing effective curriculum and teacher instruction methods. He told the Subcommittee that he would like to see federal agencies build career pathways for students from high school through mission related undergraduate and graduate research. Mr. Nelson stated that agencies should form partnerships with schools to first improve STEM education, then use that resource to further their agency's mission. He added that there is too much material that is poorly designed and does not further the education mission. Mr. Nelson would also like to see federal agencies provide incentives to retired STEM workers that encourage them to become teachers after retiring.

Mr. Reiner indicated that informal education is a great way to connect students and teachers with STEM education. He told the Subcommittee that through their three levels of interactive, hands-on exhibits, a planetarium, and an IMAX theater, the Maryland Science Center is bringing science to life. Mr. Reiner testified that the Science Center's role is to spark interest in the minds of young students and perhaps lead them to a career in science. He added that partnerships between schools, centers, and agencies are critical, and that these partnerships must be evaluated to make sure they are reaching their objectives. He strongly supported increased collaboration between federal agencies and science centers to improve STEM education. He believed that the dialogue between the two should be open to the public to increase public interest.

Dr. Weiss focused on program evaluation and federal resource allocation. Dr. Weiss emphasized that federal agencies have never had great success at evaluating their programs. She suggested programs be critiqued during the pilot stage and focus on desired outcomes and the impact of the program. Furthermore, focusing on the program during the pilot stage could increase program effectiveness without incurring major costs. Dr. Weiss also testified that she would like to see federal agencies evaluate whether or not teachers comprehend the program to ensure their program is effective. Regarding the mission agencies, Dr. Weiss stated that they should remain in the informal science arena and play a small role in the formal education system. She emphasized that federal agencies do not understand the K–12 system comprehensively and would not be able to offer a sustained effort.

4.4(e)—Federal STEM Education Programs

June 6, 2007

Hearing Volume No. 110–35

Background

On June 6, 2007, the Subcommittee on Research and Science Education held a hearing to review the K–16 science, technology, engineering, and mathematics (STEM) education activities of federal agencies and to explore current efforts for the improvement of interagency coordination and evaluation of programs. Witnesses for the hearing included (1) Dr. Cora Marrett, Assistant Director, Directorate for Education and Human Resources, National Science Foundation and Co-Chair, Education and Workforce Development Subcommittee, National Science and Technology Committee; (2) Dr. Joyce Winterton, Assistant Administrator, Office of Education, National Aeronautics and Space Administration; (3) Mr. William Valdez, Director, Office of Workforce Development for Teachers and Scientists, Office of Science, Department of Energy; and (4) Dr. Bruce Fuchs, Director, Office of Science Education, National Institutes of Health.

Summary of Hearing

Hearing Chairman McNerney opened the hearing by citing the National Academies' *Rising Above the Gathering Storm* report to emphasize the seriousness of the insufficient number of scientists and researchers graduating from America's universities. He also mentioned the previous month's hearing on STEM education and voiced his concern that not enough students are being reached to pursue a degree in STEM education. Mr. McNerney asked the witnesses to respond to the previous hearing's witnesses' concerns regarding the lack of coordination between agencies' guidelines for STEM education. He also referred to the Academic Competitiveness Council's (ACC) report that echoed those concerns.

Ranking Member Ehlers stated his belief that STEM education is a priority for this nation. He commended the agencies that participated in the ACC report and echoed the report's statement that merely developing programs is not enough. Mr. Ehlers expressed relief that the ACC report did not call for seemingly duplicative

programs such as the NSF and Department of Education Math and Science Partnerships to be automatically discontinued or merged. Mr. Ehlers cheered the re-establishment of the National Science and Technology Council Subcommittee on Education and Workforce Development and was looking forward to the NSTC subcommittee implementing the ACC recommendations.

Dr. Marrett stated that NSF owed their successes to interactions with researchers, educators, organizations, and other agencies. She emphasized that the reconstruction of the NSTC Subcommittee will help the NSF communicate more effectively with other agencies. She described this council as critical since members of the council will come from different agencies with each member having vast knowledge of their STEM education programs and have experience with evaluation research and the development of performance research. Dr. Marrett added that the reconvened subcommittee will work on educational programs for “K to gray.” She also pointed out that the NSF had created an evaluation process, in response to the ACC report, for all of their STEM education programs to examine how clear the objectives were.

Dr. Winterton highlighted several programs run by NASA that encourage STEM education, including: the Smart Skies Initiative, where students, in a simulated environment, use math to land planes safely; NASA Explorer Schools, in which a team of NASA scientists develop curriculum for an individual school so that they are able to apply their math and science education to duplicate real life practices that NASA performs; and the Digital Learning Network, in which distance learning is used for students to interact with NASA scientists. She also indicated that NASA had developed a schedule for each of their programs to determine their progress in efficiency and long-term impact. Dr. Winterton also drew attention to growth chambers of basil seeds that were developed by students and will be used on STS-118.

Mr. Valdez informed the committee that DOE’s STEM education resources are waiting in the wings and ready to be deployed. He stated that the DOE is establishing partnerships with NSF and Department of Education and that DOE is developing a rigorous evaluation program in response to the ACC report. He emphasized that he had had dozens of conversations with members of this panel and other federal agencies on how the DOE can improve STEM literacy. All agreed, including the National Science Teacher Association (NSTA) and the National Science Resource Center, that DOE programs that utilize hands-on experiences at their National Laboratories can fill a critical gap in STEM education. He indicated that the DOE is creating business plans for each program to increase effectiveness and transparency. Mr. Valdez also described a joint venture with NSTA that would have a two part certification standards for educators, which would entail a structured laboratory research experience and have DOE scientists partner with NSTA to develop online science content modules.

Dr. Fuchs informed the Subcommittee that the NIH is currently working with other agencies and outside experts to develop programs that include instructional materials, teacher professional development, and evaluation measures. Additionally, he called upon the NSF, Department of Education, and NIH to expand scientific

ically-based education research over the next 25 years. Dr. Fuchs also would like federal scientists to help develop world-class curriculum and standards for schools. Dr. Fuchs described two specific NIH programs: the Science Education Partnership Award that establishes a partnership within a community to improve science education, and the Curriculum Supplement Series in which sixteen different curriculum supplements have been developed for K–12 to help promote STEM education. Dr. Fuchs then explained that NIH aligns their curriculum with each state’s STEM standards.

***4.4(f)—The Role of Community Colleges and Industry
in Meeting the Demands for Skilled Production
Workers and Technicians in the 21st Century Econ-
omy***

June 19, 2007

Hearing Volume No. 110–42

Background

On June 19, 2007, the Subcommittee on Research and Science Education held a hearing to explore the current challenges facing industry in meeting its needs for skilled technicians and production workers in advanced manufacturing and other technology intensive sectors. Witnesses for the hearing included: (1) Dr. Gerald Pumphrey, President of South Puget Sound Community College, Olympia, Washington; (2) Dr. Stephen Fonash, Director of the Center for Nanotechnology Education and Utilization, Pennsylvania State University’s Nano-Technician Advance Technology Education Center; (3) Mr. Eric Mittelstadt, CEO of the National Advisory Council for Advanced Manufacturing (NACFAM); and (4) Ms. Monica Poindexter, Associate Director of Corporate Diversity, for Genentech, Inc.

Summary of Hearing

Chairman Baird cited the National Academies’ report, *Rising Above the Gathering Storm*, to emphasize that America is not graduating enough scientists and engineers. He added that the manufacturing world has changed. It is no longer driven by low-skilled workers but rather by workers with post-secondary education in math, science, and technology. This post-secondary education does not necessarily require a degree from a four-year institution but can be obtained at a community college. He highlighted the point that manufacturing jobs pay well. Chairman Baird praised the National Science Foundation’s thirty-three tech-training centers that work with students and community colleges to prepare the next generation of manufacturing workers. He stated that a primary focus of the hearing was to further the relationship between community colleges and industry.

Ranking Member Ehlers gave credit to community colleges for filling the gap between K–12 educational knowledge and the knowledge needed for a manufacturing career. Mr. Ehlers was deeply concerned that manufacturers spend more money on remedial education for their employees than the Federal Government spends on elementary and secondary education. Mr. Ehlers also

highlighted the Workforce Innovation and Regional Economic Development Program and the Manufacturing Extension Partnership Program that bridge the gap between skills and industry needs. He emphasized that manufacturing jobs are no longer dirty or dangerous as depicted by today's culture.

Dr. Pumphrey testified that community colleges function like a State-assisted businesses. Community colleges weigh many factors before offering a course, including: student interest; employment demand; faculty, facility, and technology costs; and initial startup costs. Dr. Pumphrey expressed concern that community colleges are not able to keep up with the changing demands of industry due to the high costs of acquiring and maintaining sophisticated equipment, supplies and software. Dr. Pumphrey suggested that low enrollment in manufacturing programs can be attributed in part to a perception of a lack of employment opportunities. He described a number of their outreach programs in local high schools, including those targeting toward women. Finally, Dr. Pumphrey emphasized that much of their resources go toward remedial education to make up for the deficient education background received at the primary and secondary levels. These remedial education expenditures prevent resources from being used on college-level work.

Dr. Fonash told the Committee that as technology fields mature, they tend to leave the United States. He said that the only way to prevent this was to be able to innovate constantly and to have an educated workforce capable of constant innovation. He emphasized that partnerships between research intensive institutions, community colleges, and industry can provide the needed education skills to keep the U.S. competitive in a global economy. Dr. Fonash cited the example of the Pennsylvania Nanofabrication Manufacturing Technology Partnership (PNMTP), which involves his own university, local community colleges, and industry. In 2001, the National Science Foundation made PNMTP an advanced education center. With twenty-one combined institutions participating in this program with industry, PNMTP has become a prestigious program and is working with community colleges across the country to establish a range of similar programs.

Mr. Mittelstadt explained that higher skill levels are essential for today's sophisticated manufacturing technologies. He testified that there are already shortages of skilled workers in the manufacturing industry and that the number will only increase. He believes that a collaborative approach with industry and education institutions, especially community colleges, will help end this shortage. Mr. Mittelstadt indicated that science, technology, engineering, and mechanical (STEM) education must improve if the U.S. is going to remain competitive in the global economy. He told the Subcommittee that "the manufacturing-skills council work of NACFAM and the American Federal of Laborers Working for America Institute" is stressing the importance of STEM education to remaining globally competitive in a changing market.

Ms. Poindexter testified that Genentech, Inc. traditionally sought to hire employees from four-year institutions, but have realized that students from community colleges are well trained and educated and sometimes already have workplace experience. Ms. Poindexter highlighted Genentech's program with Solano Commu-

nity College to create a technical program for a career in biotechnology. This program was the first of its kind and established a new academic discipline. The program allowed students to obtain a background in biotechnology, chemistry, and biotechnology regulations and gain actual lab experience that is common in a manufacturing setting. Ms. Poindexter also explained that the company launched a similar program to train former airplane mechanics into biotechnology technicians. She stated that community colleges have the capability of providing the needed skilled workers for her industry.

During the question and answer portion of the hearing, witnesses agreed that industry is a needed partner for community colleges when they are advertising for manufacturing related courses. When industry participates, enrollment in community colleges increases. Additionally, many of the witnesses called upon the Federal Government and Members of Congress to take an active roll in educating the public that there are high-paying jobs in the manufacturing industry.

4.4(g)—The Contribution of the Social Sciences to the Energy Challenge

September 25, 2007

Hearing Volume No. 110–55

Background

On September 25, 2007, the Subcommittee on Research and Science Education of the House Committee on Science and Technology held a hearing to examine how research in the social sciences, including the behavioral and economic sciences, contributes to the design, implementation and evaluation of effective policies for energy conservation and efficiency. Witnesses at the hearing included: (1) Dr. Robert Bordley, Technical Fellow, Vehicle Development Research Laboratory, General Motors Corporation; (2) Dr. Robert Cialdini, Regents' Professor of Psychology and Marketing, Arizona State University; (3) Dr. Jerry Ellig, Senior Research Fellow, Mercatus Center, George Mason University; (4) Mr. John "Skip" Laitner, Visiting Fellow and Senior Economist, American Council for an Energy Efficient Economy; and (5) Dr. Duane Wegener, Professor of Psychological Sciences, Purdue University.

Summary of Hearing

Chairman Baird opened the hearing by emphasizing the energy savings that aggregated individual consumer decisions could create. He added that just informing consumers about how to save energy is not sufficient to create action on the part of individuals. The social sciences provide a way to affect individual decisions and make major inroads into America's energy problem. Ranking Member Ehlers added that consumers do not always see the effects of their energy-related decisions, so they do not always make the most rational decisions. He also noted that the social sciences could also be applied to other areas important to the Committee, such as analyzing an individual's decision whether or not to become a teacher.

Dr. Cialdini pointed out that not only did public service campaigns sometimes fail to work as intended, they occasionally encouraged the very behavior they were trying to prevent. Even small details, like the number of people depicted on a sign intended to prevent theft of artifacts in a national park, can have large unintended impacts. Simple research studies, such as a study he carried out regarding the reuse of towels in a major hotel, could help determine the most effective messages for influencing behavior.

Dr. Wegener described some of his research on the persistence of social attitudes and how the general public holds positive attitudes towards energy conservation which do not translate into action. He explained that social science research has identified a number of factors that influence behavior. For example, there has been research into what affects the strength of an attitude and its resistance to outside influences. Currently, he is researching what social factors influence the acceptance of new technologies and how these attitudes can be changed.

Mr. Laitner was concerned with encouraging technological entrepreneurs and early adoption of better processes. He argued that there were signals affecting energy consumption beyond price signals. Discovering them was crucial to learning how to grow energy conservation faster than energy use.

Dr. Ellig noted that institutions help create the incentives that guide the flow of knowledge and that access to knowledge determines in many cases what decisions will be made. He advised making it clearer in statutes that Congress wishes to find data on the results of its policies and he also advised being open to all kinds of data, rather than keeping potentially useful information from decision-makers.

Dr. Bordley described his studies of how consumers assign themselves and products to groups. The process by which demand can be modeled mirrors the process by which policy-makers could learn how to create a model of public behavior regarding energy conservation. He stated that individuals are systematically irrational and that the Internet is shaping attitudes in a new ways not yet understood.

When Mr. McNerney asked about the status of modeling efforts, Dr. Bordley answered that the field had advanced remarkably in the past five years. The issue today is less understanding how to model behavior, but getting better data inputs to create better models. He said that as consumer behavior changed to reflect different energy conservation preferences, companies would change their behavior out of self-interest. He added that the prospect of massive losses motivates company behavior even more than the prospect of massive gains.

Mr. Ehlers asked what role the Federal Government should play in shaping public behavior. Dr. Bordley argued that the government has a role to the extent that it can create win-win situations and shift behavior patterns to bring a benefit to everyone involved. Dr. Wegener contended that research into behavior was just another manner in which research sponsored by the government could bring benefits to society at large. Later in the hearing, Dr. Wegener and Dr. Ellig noted that while economic incentives would change behavior as fossil fuels became scarcer, it was important to

remember the limitations of the social sciences in affecting behavior. Value judgments could easily creep into statements about where problems existed.

Mr. Baird and Mr. Lipinski asked about the interactions between the social sciences and the physical sciences on the topic of energy conservation and whether science education was encouraging interdisciplinary work. Dr. Wegener stated that social science was not on the map for most physical scientists, who seemed unaware that they could take advantage of studies on cultural barriers to new technologies or on opposition to nuclear power. He cited some of the benefits that a closer collaboration could bring and suggested the challenge was going to be encouraging a balance of interdisciplinary research and a deep education in one critical field. Dr. Cialdini mentioned his own efforts in raising awareness among the physical sciences and said the issue required sustained attention. Dr. Bordley offered his opinion that a lot of social science went into the field of technology transfers, such as designing new products to make consumers comfortable and marketing them to target audiences. He thought that the physical scientists and engineers he had worked with had not made the connection between the two areas yet. Dr. Ellig stated that the attitudes scientists carried with them regarding interdisciplinary collaboration were largely formed in graduate school and could be shaped there to encourage such collaboration. Mr. Laitner said that the interest in interdisciplinary studies had been growing, but the infrastructure and funding for doing so had not yet become available.

4.4(h)—Nanotechnology Education

October 2, 2007

Hearing Volume No. 110–60

Background

On October 2, 2007, the Subcommittee on Research and Science Education held a hearing to receive testimony on H.R. 2436, the *Nanotechnology in Schools Act*, and also to review current nanotechnology education activities supported under the National Nanotechnology Initiative (NNI) and to explore issues associated with educating students and the public about nanotechnology. Witnesses for the hearing included: (1) Dr. David Ucko, Deputy Director of the Division on Research and Learning of the Education and Human Resources Directorate, National Science Foundation (NSF); (2) Dr. Navida Ganguly, Head of the Science Department at Oak Ridge High School, Oak Ridge, Tennessee; (3) Dr. Hamish Fraser, Ohio Regents Eminent Scholar and Professor, Department of Materials Science Engineering, the Ohio State University; (4) Dr. Ray Vandiver, Vice President of New Project Development, Oregon Museum of Science and Industry; (5) Mr. Sean Murdock, Executive Director, NanoBusiness Alliance; and (6) Dr. Gerald Wheeler, Executive Director, National Science Teachers Association.

Summary of Hearing

Chairman Baird expressed in his opening statement that because the government currently invests \$1.5 billion in NNI, the primary

goal of this hearing was to elucidate how to build a workforce capable of advancing the Nation's nanotechnology capabilities. Ranking Member Ehlers stated that while the goal of the bill, H.R. 2436, is commendable, he had concerns that it provides equipment only to low-needs schools. He suggested a better route would be to encourage companies to donate equipment and employee time to exceptional high schools and undergraduate programs. Ms. Hooley, the author of the *Nanotechnology in Schools Act*, explained this bill would authorize \$15 million for NSF to provide nanotechnology equipment for high schools and colleges.

Mr. Ucko cited several educational outreach programs funded by NSF to encourage nanotechnology education, such as bridge programs with universities and high schools, nano education workshops, and the Nanoscale Informal Science Education Network. He stated that these projects should generate nanotechnology education strategies.

Ms. Ganguly, who has taught both college and high school, said that, from her experience, getting students excited about science must begin at the high school age. She gave examples of experiments held in her classroom where she brought in advanced technology, inspiring the students to see the possibilities science presents. She sees access to nanotechnology for high school students as a promising way to encourage students to pursue science later in life.

Mr. Fraser was also optimistic that having hands-on and immediate access to nanotechnology would "capture the imagination of students." Promoting attractive undergraduate courses in nanotechnology will lead to increased numbers of students studying science and technology and will provide for a suitably trained workforce. He added that the equipment provided for schools is not the equipment actually used in the field, but education modules for teachers and students that would be available for students from all schools, not giving preference to high or low need institutions.

Mr. Vandiver stated that from his experience working with the Nanoscale Informal Science Education Network, the general public has an interest in nanotechnology, and this bill would certainly help to make it more available and comprehensible for students and the public. He encouraged the Committee to consider museums as potential recipients of funds for nanotechnology education, as they have historically provided innovative and interesting ways of educating the public through various programs.

Mr. Murdock testified that nanotechnology is the frontier of science-based innovation, linking various disciplines within the sciences, such as physics, chemistry, and biology. He said that Russia has committed \$5.1 billion to nanoscience research and that other nations are following suit. He was supportive of the bill because it does not impose curriculum or the use of the nanotechnology equipment but empowers educators to integrate it into their teaching as they see fit.

Mr. Wheeler presented a less positive view of the legislation. He said that in light of the already formidable challenges facing science education, the proposed high school programs are inappropriate. He cited the National Academy of Sciences report about American high school laboratories as evidence that the goal should

be to enhance already existing curriculum, as opposed to adding more advanced technologies. He said most schools have safety, budget, and training limitations that would make nanotechnology education almost impossible. He suggested that the Committee work on providing funds to get labs basic equipment before providing them with advanced materials.

Mr. Baird said that though he recognizes the difficulties facing science education in high schools, the \$15 million for nanotechnology would only be a “drop in the bucket” if used towards refurbishing labs, and that this responsibility lies with the local school districts. He then asked, if the money is to be used for nanotechnology, what the most effective use of the funding will be. Mr. Fraser offered that providing schools with simulators, in addition to visits from traveling hands-on opportunities would be a good way of integrating nanotechnology into schools. Mr. Ucko gave an example of a study that compared traditional learning about viruses versus cyber learning, showing that cyber learning was far more effective.

Mr. Ehlers brought up the fact that Congress does not have infinite funds and that though this bill does provide exciting opportunities for students, it is just not a top priority for federal funding.

Mr. McNerney asked the witnesses whether high school nanotechnology training will lead to jobs downstream. Mr. Murdock responded that, though perhaps indirectly, access to this technology would certainly sow the seeds of inspiration for students to pursue this career later in life.

Mr. Neugebauer posed the question of who is providing the nanotechnology workforce, today. Mr. Murdock responded that it is primarily Ph.D. scientists and engineers, but that eventually we will need technicians and undergraduate engineers.

Mr. Baird asked the panel to provide two or three key criteria for investments from the money provided in this bill. Mr. Ucko responded that it should be a well-developed, well-tested program, as opposed to simply planting machinery in schools. Ms. Ganguly emphasized the importance of teacher and professional development. Mr. Fraser suggested developing modules in collaborations between high school teachers and faculty. Mr. Vandiver said that a competitive grant process would be favorable, producing the most promising programs. Mr. Wheeler was unsure whether high schools were the appropriate place for these funds.

4.4(i)—Assessment of the National Science Board’s Action Plan for STEM Education

October 10, 2007

Hearing Volume No. 110-63

Background

On October 10, 2007, the Research and Science Education Subcommittee held a hearing to receive testimony related to a proposal from the National Science Board (NSB): “A National Action Plan for Addressing the Critical Needs of the U.S. Science, Technology, Engineering, and Mathematics Education System.” This plan, which was released by the NSB on October 3, proposes a series of

steps that the Board believes will bring greater coherence to the Nation's science, technology, engineering and mathematics (STEM) education system and ensure that students are taught by highly effective STEM teachers.

Witnesses for the hearing included: (1) Dr. Steven Beering, Chairman, National Science Board; (2) Ms. Judy A. Jeffrey, Director, Iowa Department of Education and Representing the Council of Chief State School Officers; (3) Dr. Francis (Skip) Fennell, President, National Council of Teachers of Mathematics and Professor of Education at McDaniel College; (4) Ms. Chrisanne Gayl, Director of Federal Programs, National School Boards Association; (5) Dr. Robert Semper, Executive Associate Director, The Exploratorium and Representing the Association of Science-Technology Centers; and (6) Ms. Susan L. Traiman, Director, Education and Workforce Policy Business Roundtable.

Summary of Hearing

Dr. Beering described the process for developing the action plan and provided a summary of the plan. He emphasized four places where greater coordination of STEM activities is needed: across the Federal Government, where the Board recommends the creation of a new committee within the National Science and Technology Council; within the Department of Education, where the Board recommends designating a new Assistant Secretary for STEM Education; within the National Science Foundation; and most importantly, across all of the states at all levels (so-called horizontal and vertical alignment) through the creation of a non-Federal National Council for STEM Education.

Ms. Jeffrey praised the NSB report generally, and in particular the call for better coordination of STEM activities at the federal level. However, she expressed concern about some aspects of the report, stating that the proposed Council runs the risk of creating another level of bureaucracy and that the report calls for better assessment without explaining how states would deal with the cost and time it takes to develop more complex assessments.

Dr. Fennell testified that the National Council of Teachers of Mathematics (NCTM) supports all of the elements of the Action Plan, including the creation of a National Council for STEM Education. He discussed NCTM's Curriculum Focal Points and NCTM's efforts to get the Focal Points incorporated into State math standards.

Ms. Gayl called the Action Plan a "step in the right direction" but cautioned the Committee that some of the recommendations in the Action Plan, including the National STEM Council, and national content guidelines, could ultimately erode State and local control over education. She also expressed concern that the Action Plan did not mention the need for up-to-date laboratory equipment and modern classrooms.

Dr. Semper discussed the important role that informal science education institutions play in K-12 STEM education, and expressed support for the Action Plan overall, including the idea of a National STEM Council.

Ms. Traiman described the current system of 50 different State STEM standards as "absurd" but expressed concern that NSB's rec-

ommendation for a National STEM Council ignore the history and politics of education in the U.S. She added that the business community in general is not supporting a federal role in the development of voluntary national standards for now but has no consensus opinion on the creation of a National STEM Council.

4.4(j)—Women in Academic Science and Engineering

October 17, 2007

Hearing Volume No. 110–65

Background

On October 17, 2007, the Subcommittee on Research and Science Education held a hearing to examine institutional and cultural barriers to recruitment and retention of women faculty in science and engineering (S&E) fields, best practices for overcoming these barriers, and the role that federal research agencies can play in disseminating and promoting best practices. Witnesses for the hearing included (1) Dr. Donna Shalala, President, University of Miami; (2) Dr. Kathie Olsen, Deputy Director, National Science Foundation; (3) Dr. Freeman Hrabowski, President, University of Maryland Baltimore County; (4) Dr. Myron Campbell, Chair of Physics, University of Michigan; and (5) Dr. Gretchen Ritter, Professor of Government, University of Texas at Austin.

Summary of Hearing

Chairman Baird opened the hearing by citing the increase in the number of women receiving Ph.D.s but also by noting that women still only hold 28 percent of all full-time S&E faculty positions, and only 18 percent of full professorships. He emphasized the importance of encouraging all talented individuals to continue pursuing careers in S&E fields during this critical period when the U.S. desperately needs to increase its competitive advantage among foreign nations. Ranking Member Ehlert cited the National Academies' 2006 *Beyond Bias and Barriers* report, which states that both the culture and structure of scientific institutions must be changed so that women may advance in science and engineering. He cited China as a country where women hold 50 percent of S&E jobs in support of the idea that women in the U.S. are culturally influenced against pursuing these careers. He stressed that women must have mentors to inspire and guide them.

Dr. Shalala commented on the fact that women are disadvantaged because they are "paid less, promoted more slowly and receive fewer honors and hold fewer leadership positions than men." She recommended that federal funding agencies counter these biases by making sure that all rules support participation of women, providing workshops on gender bias for department chairs, conducting research on gender bias, and enforcing anti-discrimination laws in all institutions of higher education.

Dr. Olsen was very enthusiastic about NSF's treatment of women in the workplace, saying it provides an example that can be followed by other science institutions. At NSF, all managers and supervisors are trained in diversity management. Dr. Olsen also spoke about the NSF ADVANCE program, which has provided

funding to 58 institutions of higher education. This program focuses on sweeping institutional changes that create a women-friendly environment. It has resulted in increased female faculty hires as well as advancement towards salary parity. When Mr. Baird asked whether mentoring should be more highly rewarded, Dr. Olsen responded that rewarding mentoring in the tenure process would be extremely helpful, as women often have difficulty achieving tenure when they are required to take on so many roles for which they are not recognized.

Dr. Hrabowski stated that the ADVANCE program has resulted in a 48 percent increase in tenure-track S&E women faculty at UMBC. He gave several examples of changes in practice that have encouraged mobility in women and minorities within S&E departments. He underlined that a primary change being made at the university is to foster a climate where men, women, junior, and senior faculty can speak freely without fear of criticism. When Mr. Baird asked the panel whether ADVANCE successes could be replicated at institutions that did not seek ADVANCE funding, Dr. Hrabowski responded that all universities will respond to monetary incentives.

Dr. Campbell testified that only four percent of full professors in physics are women. He stated it is not the woman's responsibility to fight this trend, but all science professionals, that there is not a "magic-bullet" solution, and that improving the climate is crucial to encouraging women to advance in these fields. He also suggested that the ADVANCE program should be expanded and that federal rules be changed to allow small grants for child care for scientists attending conferences and meetings.

Dr. Ritter outlined four barriers to women's advancement in higher education: climate, work-family balance, professional assessment/rewards, and absence of senior women. She also advised that the Federal Government expand ADVANCE and use Title IX enforcement to advance women in under-represented fields. Mr. Baird questioned how this could be achieved, and Dr. Ritter explained that presidents and provosts must hold deans accountable, and that deans must hold chairs accountable for having diverse pools and being willing to accept diverse candidates.

When Mr. Ehlers asked why women are more successful in medicine and other fields once dominated by men than they are in S&E fields, Dr. Shalala suggested that medicine provides a track which allows success while permitting more flexible hours. Dr. Campbell responded that those other fields tend to be a "top-down," which makes changing the climate easier than in academia and Dr. Hrabowski replied that women are much more likely to receive mentoring and guidance to choose these fields.

Mr. McNerney asked Dr. Shalala if there were any encouraging statistics that might indicate that women's numbers are in fact growing and that legacy effects are one potential cause of the continued dominance of men in S&E fields. Dr. Shalala explained that while the pools of talent are present, with 52 percent of undergraduate science students being female, the representation of women at the faculty level is still extremely low. When asked by Mr. Neugebauer whether the private sector was funneling women away from these jobs, Dr. Shalala stated that economic incentives

for women in the private sector were not so impressive that, given the right climate, women would choose working in the private sector over academic science.

4.4(k)—Research on Environmental and Safety Impacts of Nanotechnology: Current Status of Planning and Implementation Under the National Nanotechnology Initiative

October 31, 2007

Hearing Volume No. 110-69

Background

On October 31, 2007, the Subcommittee on Research and Science Education held a hearing to review the need and motivation for research on the environmental, health and safety (EHS) aspects of nanotechnology, determine the current state of planning and implementation of EHS research under the National Nanotechnology Initiative (NNI), and explore whether changes are needed to the current mechanisms for planning and implementing EHS research. This hearing is one in a series to review the administration and content of the NNI as part of the process for developing legislation to reauthorize the *21st Century Nanotechnology Research and Development Act of 2003* (P.L. 108-153).

Witnesses for the hearing included: (1) Dr. Clayton Teague, Director of the National Nanotechnology Coordination Office (NNCO); (2) Mr. Floyd Kvamme, Co-Chair of the President's Council of Advisors on Science and Technology (PCAST); (3) Dr. Vicki L. Colvin, Executive Director, International Council on Nanotechnology and Professor of Chemistry and Chemical Engineering at Rice University; (4) Dr. Andrew Maynard, Chief Science Advisor, Project on Emerging Nanotechnologies, Woodrow Wilson International Center for Scholars; (5) Dr. Richard Denison, Senior Scientist, Environmental Defense; and (6) Mr. Paul D. Ziegler, Chairman of the Nanotechnology Panel, American Chemistry Council, and Global Director, PPG Industries, Inc.

Summary of Hearing

Chairman Baird pointed out the unanimity of views on the importance of EHS research for the development of nanotechnology and the necessity of a well designed and adequately funded EHS research component of the NNI. He stressed the concern that the interagency planning for and implementation of the EHS research component of NNI was not moving with the urgency it deserved and indicated the Committee may want to modify the existing planning and coordination mechanisms during the reauthorization of the NNI.

Ranking Member Ehlers emphasized the importance of EHS research and pointed out the difficulty of the problem of quantifying the potential health and environmental risks of nanotechnology. He indicated the need for Congress to continually assess whether research priorities are being established and effectively implemented, and whether research findings of risk research are being shared with all stakeholders, including the public.

Dr. Teague reviewed the current process for planning the EHS research component of the NNI, asserting that the process has been effective and that the participating agencies believe the process is working well. He pointed out that it is a consensus-based process involving 20 agencies, which means it is a slow process but results in agency buy-in. He indicated that the identification of key research areas has been completed and that the agencies are now reviewing a detailed compilation of EHS research projects funded by NNI agencies during FY 2006. The final result of this ongoing work will be a strategic plan for EHS research that will be released by early 2008.

Mr. Kvamme indicated that PCAST is in the process of assessing the EHS research component of the NNI with the help of a 60-member technical advisory group of academic and industry experts and will release its report on the assessment in January 2008. He stated that the NNI's approach for understanding and managing potential risks of nanotechnology is sound and appropriate and that EHS research should remain integrated with the broader NNI research portfolio. Also, he believes funding for EHS research is at the right scale, shows appropriately steady growth, and should not be set at an arbitrary level or as a fixed percentage of the total NNI funding.

Dr. Colvin called for the rapid completion of a strategic plan for EHS research. She praised NNCO for completion of its document prioritizing research needs but noted that the research needs are not grouped by how they connect to end objectives for developing safe nanotechnology. She believes the strategic plan should articulate shared goals across the agencies to drive the research investments. One immediate priority that she believes must be addressed is to develop a common set of tools for risk research, including terminology, methods, data structures, and materials.

Dr. Maynard stated that the NNI has been showing good intentions to address the risk aspect of nanotechnology, but good intentions are not enough. He called for a top-down research strategy in place by the end of the year backed up with necessary resources and authorities for implementation and funded at 10 percent of the total NNI budget, plus \$50 million per year for targeted research on near-term needs. In addition, he recommended creation of a public/private partnership funded at \$10 million per year for five years to address critical research questions in support of government and industry oversight and recommended establishing a targeted program of public engagement on nanotechnology featuring two-way communication between developer and users if the technology.

Dr. Denison made three main points: 1) too little is being spent on EHS research (he recommends 10 percent of the NNI total) and the allocation of spending among agencies is incorrect (the agencies with regulatory responsibilities should have the bulk of the resources); 2) too little is known about what the current funding is supporting (he recommends publishing the list of EHS research projects); and 3) progress toward development of the EHS research strategy has been "glacial." He asserts that a new mechanism is needed which has the responsibility and controls the resources to develop and manage the overall risk research strategy and which

receives assistance from the National Academy of Sciences in developing and overseeing the strategy. He recommends that the mechanism developed separates responsibility for developing and advancing nanotechnology from responsibility for identifying and mitigating risk.

Mr. Ziegler stated that federal coordination and support of EHS research is essential for the responsible development of nanotechnology and its commercial acceptance and that the current process for planning and implementing EHS research is too slow and is incomplete. He made recommendations for the types of EHS information that would be important to industry. He also recommended that the National Academy of Sciences be used to help establish EHS research priorities and roadmaps and that funding for EHS research be substantially increased.

4.4(l)—Status of Visas and Other Policies for Foreign Students and Scholars

February 7, 2008

Hearing Volume No. 110-74

Background

On Thursday, February 7, 2008, the Honorable Brian Baird presiding, the Subcommittee on Research and Science Education held a hearing to review the status of visas and other policies governing the entry of foreign students into the United States. The witnesses and Members also examined the ongoing impediments to implementation of the foreign student policies, as well as the impact that such impediments may be having on the U.S. scientific enterprise. In addition, the Subcommittee explored recommendations for changes or improvements to existing policy.

There were four witnesses: 1) Mr. Stephen A. “Tony” Edson, Deputy Assistant Secretary for Visa Services, Bureau of Consular Affairs, Department of State; 2) Dr. Harvey V. Fineberg, President, Institute of Medicine, The National Academies; 3) Dr. Allan E. Goodman, President and CEO, Institute of International Education; and 4) Ms. Catheryn Cotten, Director, International Office, Duke University.

Summary of Hearing

Chairman Baird opened the hearing with an emphasis on the crucial role foreign scholars play in our own national scientific progress and reputation. Rep. Neugebauer discussed the importance of this issue to the medical community, and submitted the written statement of Dr. Leighann Jenkins of the Texas Tech University School of Medicine. Ranking Member Ehlers focused on the bureaucratic hurdles and resulting personal hardships faced by many foreign scholars and students in the United States.

Mr. Edson testified about recent Department of State (DOS) efforts to streamline visa policies and the positive influence these changes are having. Dr. Fineberg discussed the importance of international scientific exchanges to the U.S. science and engineering enterprise, and testified about the role of The National Academies’ International Visitors Office in working with DOS to facili-

tate open exchange of scientists. He also made recommendations for possible changes to visa policy and for additional actions that DOS could take to reform visa policy, including focusing our national security resources where the risks are highest. Dr. Goodman discussed the role of the Institute for International Education in promoting open exchange of students. He praised efforts at DOS to ease the administrative burdens on foreign students over the last few years but criticized the Department of Homeland Security (DHS) for their treatment of visitors at the border. Ms. Cotton testified about the impact of visa policies on universities and how universities are addressing their concerns. She also made specific recommendations to Congress, DHS and DOS about changes to visa policies in order to improve the flow of students and scholars without compromising security. Members asked about aspects of visa policy and processing, including general work permission, appeals, “bars” in the exchange visitor program and timing of eligibility for H1-B visas. All of the witnesses agreed that visa policies and practices could still be strengthened from a security perspective while easing the flow of students and scholars that are indispensable to the U.S. science and engineering enterprise.

4.4(m)—Oversight of the National Science Foundation

February 26, 2008

Hearing Volume No. 110-77

Background

On Tuesday, February 26, 2008, the Honorable Brian Baird presiding, the Subcommittee on Research and Science Education held a hearing to receive testimony from the Director of the National Science Foundation (NSF) and the Chair of the National Science Board (NSB) regarding NSF’s fiscal year (FY) 2009 budget request and related policy issues.

There were two witnesses: 1) Dr. Arden L. Bement, Jr., Director of the National Science Foundation; and 2) Dr. Steven C. Beering, Chairman of the National Science Board.

Summary of Hearing

Chairman Baird opened the hearing by expressing support for the overall budget but disappointment at the proposed funding level for the Noyce Teacher Scholarship Program. Ranking Member Ehlers expressed concern that the proposed budget fell short of the levels authorized in the *America COMPETES Act* (P.L. 110-69) and could discourage young scientists from choosing science careers.

Dr. Beering and Dr. Bement testified about NSF’s FY 2009 budget request, and in particular discussed how the budget request addresses the programs authorized in the *COMPETES Act*. Dr. Beering also testified about recent NSB reports on science and math education and on international partnerships. Members of the Committee focused many of their questions on NSF’s education programs and expressed concern about NSF’s intent to fund the Noyce Teacher Scholarship program below the authorized level.

Chairman Baird also asked Dr. Bement about NSF's international programs, social and behavioral research programs, and about policy changes for the major research equipment account. Overall, Members of the Committee expressed satisfaction with the proposed budget and with NSF's new initiatives for FY 2009.

4.4(n)—The Transfer of National Nanotechnology Initiative Research Outcomes for Commercial and Public Benefit

March 11, 2008

Hearing Volume No. 110-82

Background

On Tuesday, March 11, 2008, the Honorable Brian Baird presiding, the Subcommittee on Research and Science Education held a hearing to review the activities of the NNI in fostering the transfer of nanotechnology research outcomes to commercially viable products, devices, and processes. As part of the reauthorization process for the National Nanotechnology Initiative (NNI), the hearing also reviewed the current federal efforts related to support of research on nanomanufacturing.

Witnesses for the hearing included: (1) Mr. Skip Rung, President and Executive Director, Oregon Nanoscience and Microtechnologies Institute (ONAMI); (2) Dr. Julie Chen, Co-Director, Nanomanufacturing Center of Excellence at the University of Massachusetts Lowell; (3) Dr. Jeffrey Welser, Director of the Nanoelectronics Research Initiative (NRI) and representing IBM Corporation and the Semiconductor Research Corporation; (4) Mr. William Moffitt, CEO of Nanosphere, Inc. and representing the NanoBusiness Alliance; and (5) Dr. Mark Melliar-Smith, CEO of Molecular Imprints, Inc.

Summary of Hearing

Chairman Baird opened the hearing by pointing out the importance of cultivating usable products and processes from our federal investment in nanotechnology research, noting some unique challenges nanotechnology development and commercialization will have to address. Ranking Member Ehlers framed the NNI reauthorization as an opportunity for encouraging innovation and global competitiveness, and he suggested that the conventional balance of R&D might need adjustment to promote nanotechnology commercialization.

In his testimony, Mr. Rung provided a thorough profile of ONAMI's activities. Dr. Chen detailed a four point approach to fostering technology transfer, emphasizing a need for university-industry interaction and a flexible, diversified approach to research and process development. Dr. Wesler offered the perspective of the nanotechnology research industry, arguing for close cooperation among government, academia, and industry, and explaining how the Federal Government can contribute to goal-oriented research activities and commercializing nanotechnology. Mr. Moffitt detailed how Nanosphere, Inc. has incorporated nanotechnology into the health care industry, and then identified the challenges and poten-

tial national benefits to its commercialization in general. Mr. Mellier-Smith explained Molecular Imprints' progress in specific nanotechnology development projects, lauding the contributions of several government agencies as integral to the company's financial and technological success.

During the discussion period of the hearing, Chairman Baird received each witness's recommendation for what the priorities in re-authorizing NNI should be, which included funding specifications and an emphasis on cooperation between the varying interest groups. The witnesses stressed the importance of basic research in nanomanufacturing and adequate funding for geographically diverse user facilities. The witnesses were clear that basic research funding should be broad to allow for new discoveries and pioneering research; however, they indicated that it would be wise to focus some funding and planning toward commercialization. Dr. Chen and Mr. Moffitt stressed the roles of demonstration and education in commercialization efforts. The witnesses also emphasized the importance of collaboration with national laboratories and universities. In light of the State of New York's successful efforts, they offered Rep. Lipinski several examples of successful techniques for promoting nanotechnology. The discussion also addressed environmental, health and safety concerns, how and why the U.S. should maintain an internationally competitive edge, the role of the America COMPETES Act, and the possibility of organizing the NNI investment as a venture capital endeavor.

4.4(o)—International Science and Technology Cooperation

April 2, 2008

Hearing Volume No. 110–89

Background

On Wednesday, April 2, 2008, the Honorable Brian Baird presiding, the Subcommittee on Research and Science Education held a hearing to examine the mechanisms by which federal priorities are set and interagency coordination is achieved for international science and technology cooperation, and to explore the diplomatic benefits of such cooperation.

There were five witnesses: 1) Dr. John H. Marburger III, Director, Office of Science and Technology Policy; 2) Dr. Arden L. Bement, Jr., Director, National Science Foundation; 3) Dr. Nina V. Fedoroff, Science and Technology Adviser to the Secretary of State; 4) Mr. Jeff Miotke, Deputy Assistant Secretary of State for Science, Space and Health, Bureau of Oceans and International Environmental and Scientific Affairs; and 5) Mr. Michael F. O'Brien, Assistant Administrator for External Relations, National Aeronautics and Space Administration.

Summary of Hearing

Chairman Baird opened by citing the difficult issues of budget and authority lines in international scientific cooperation and discussing the importance of scientific cooperation to U.S. diplomacy.

Representatives Ehlers, Neugebauer, Johnson and Carnahan submitted statements for the record.

Witnesses agreed on the importance of international cooperation to the U.S. science and engineering enterprise and to U.S. diplomatic objectives. Dr. Marburger testified about the mechanisms for interagency coordination, commenting on OSTP's relationship and shared duties with the Department of State in particular. He also discussed the many international science organizations and meetings in which he or his staff participate. Dr. Bement described the National Science Foundation's broad international research and education portfolio and specifically the programs in the Office of International Science and Engineering. He also discussed the leadership role that NSF plays in fostering global science and engineering cooperation. Dr. Fedoroff spoke about the benefits of science diplomacy for bridging political divides and achieving U.S. national security objectives. She testified about the role of S&T at the Department of State and at the U.S. Agency for International Development, and specifically about the role of her office. Mr. Miotke gave examples of the importance of S&T to diplomacy and development and cited several recent bilateral S&T agreements. Mr. O'Brien provided highlights of NASA's especially cooperative international history and the importance of cooperation to achieving NASA's missions.

Witnesses expanded on these themes during the discussion period. Dr. Marburger noted that an international presence gives us access to all the frontiers of science, such as extreme climates, and a chance to augment our own human capital by attracting foreign specialists. Dr. Bement added that it can give us access to the best research facilities worldwide. He and Mr. Miotke also pointed out the benefits of international S&T cooperation to developing countries, particularly in the promotion of education. Drs. Marburger and Bement described a number of partnerships and projects that U.S. agencies are planning or currently operating. Chairman Baird closed with a statement about the importance of funding bilateral S&T agreements and submitted for the record an article by Dr. Norman Neureiter about the role of S&T at the Department of State.

4.4(p)—Role of the Social and Behavioral Sciences in National Security

April 24, 2008

Hearing Volume No. 110-95

Background

On April 24, 2008, the Honorable Adam Smith presiding, the Subcommittee on Research and Science Education held a joint hearing with the House Armed Services Subcommittee on Terrorism, Unconventional Threats and Capabilities. The purpose of the hearing was to provide the Subcommittees with a broad overview as to why understanding the human terrain is critical to the achievement of success in national security operations and to examine the role of basic and applied research in the social and behavioral sciences in meeting U.S. national security needs. In addi-

tion to reviewing the state of current research and needs for the future, the Subcommittees also solicited testimony regarding opportunities for partnership between the Department of Defense (DOD) and the National Science Foundation (NSF) in supporting this research.

There were four witnesses: 1) Dr. André Van Tilborg, Deputy Under Secretary of Defense (Science and Technology); 2) Colonel Martin Schweitzer, Commander 4th Brigade Combat Team, 82nd Airborne Division; 3) Dr. Mark Weiss, Division Director for Behavioral and Cognitive Sciences, National Science Foundation; and 4) Dr. David Segal, Professor of Sociology and Director of the Center for Research on Military Organization, University of Maryland.

Summary of Hearing

Chairman Smith opened the hearing with a brief statement about the purpose of the joint hearing. Chairman Baird followed by comparing the potential for social sciences to help save the lives of soldiers to that of new technologies. Ranking Member Ehlers also talked about the role of social science research in strengthening our military and the potential for NSF and DOD to work together to that end.

Dr. Van Tilborg spoke about DOD's research efforts that specifically relate to unconventional warfare and terrorism. He testified that DOD's investment in social science research is approximately \$150 million, one-third of which is focused on the topic of the hearing. He listed the various departments and offices that help support this research and the venues through which social science research is coordinated. Col. Schweitzer testified about the effectiveness of DOD's human terrain system program in Afghanistan. He talked about his personal experience with a human terrain team that helped stop a five-year cycle of attacks by Taliban fighters in one province of Afghanistan after the team figured out who the real power brokers were in that province. Dr. Weiss testified about the range of social and behavioral research supported by NSF that could be of interest to the military, even though it is basic research. He cited three research studies in particular that could inform DOD efforts. He also discussed how NSF might provide intellectual support to DOD's efforts to expand its support of the social and behavioral sciences. Dr. Segal testified about the University of Maryland Center for Research on Military Organization, and the nature of his and his colleagues' research. He spoke about how such research has and can continue to contribute to national security and listed ways in which he and his colleagues have communicated their research findings to DOD.

Much of the discussion period focused on Col. Schweitzer's experiences with the human terrain system program in Afghanistan and how to improve and expand upon that program. Rep. Lipinski turned the discussion in the direction of NSF's appropriate role in funding social and behavioral research relevant to national security. All of the witnesses agreed that there is a lot of research that potentially fits well into both NSF's and DOD's mission and that NSF need not compromise its own mission or integrity in any way to support that research. Ranking Member Thornberry of the Armed Services Subcommittee asked about the level of rigor in be-

havioral and social science research, to which witnesses answered that it is more difficult to have objective metrics in these fields but that new technologies and ways of thinking about human behavior are allowing researchers to add levels of rigor to their studies. All four witnesses looked very favorably on increased partnerships between NSF and DOD in the social and behavioral sciences to help the Nation meet its security needs.

***4.4(q)—Fulfilling the Potential of Women in
Academic Science and Engineering Act of 2008***

May 8, 2008

Hearing Volume No. 110–100

Background

On Thursday, May 8, 2008, the Honorable Brian Baird presiding, the Subcommittee on Research and Science Education held a hearing to obtain comments on a discussion draft of the *Fulfilling the Potential of Women in Academic Science and Engineering Act of 2008*. The draft bill would provide for federal programs to address the barriers to the advancement of women in academic science and engineering and require the collection of more comprehensive demographic data on the federal science agencies' grant-making processes.

There were three witnesses: (1) Dr. Lynda T. Carlson, Director of the Division of Science Resource Statistics, Directorate for Social, Behavioral and Economic Sciences, National Science Foundation; (2) Dr. Linda G. Blevins, Senior Technical Advisor in the Office of the Deputy Director for Science Programs, Office of Science, Department of Energy; and (3) Dr. Donna K. Ginther, Associate Professor of Economics and Director of the Center for Economic and Business Analysis, Institute for Policy Research, University of Kansas.

Summary of Hearing

Chairman Baird and Ranking Member Ehlers entered their opening statements into the record and proceeded to witness testimony. In her testimony, Dr. Carlson expressed concern that the draft bill language implied that the National Science Foundation (NSF) would be held accountable for other agencies' demographic data collection, but also acknowledged that NSF itself already collects all of the data required in the bill. She also reminded Members that faculty cannot be required to report gender or minority status on research grant applications, so such data will always be incomplete. Dr. Blevins discussed her experience participating in and advising on workshops such as those described in the draft bill, and emphasized the need for senior people in each discipline to take ownership of their own workshop planning for the workshops to be effective. Dr. Ginther testified that more data were needed to truly understand the reasons why women leave academic science and engineering careers at higher rates than men. Her main recommendation to the Federal Government was to allow university daycare facilities to be counted toward indirect costs for federal research grants.

During the discussion period Chairman Baird pursued the issue of data collection across agencies. He and Rep. Ehlers both questioned witnesses about the metrics for effective gender bias workshops. Members also asked about Dr. Ginther's recommendation for NSF to create a productivity database. Witnesses offered some suggestions for improving the proposed legislation.

4.4(r)—The State of Hurricane Research and H.R. 2407, the National Hurricane Research Initiative Act of 2007

June 26, 2008

Hearing Volume No. 110–112

Background

On Thursday June 26, 2008, the Honorable Nick Lampson presiding, the Subcommittee on Energy and Environment and the Subcommittee on Research and Science Education held a joint hearing to examine the Nation's hurricane research and development priorities, and to receive testimony on H.R. 2407, the *National Hurricane Research Initiative Act of 2007*, introduced by Representative Hastings (D–FL), which establishes a National Hurricane Research Initiative to improve hurricane preparedness.

There were two witness panels. The first panel included: 1) Rep. Alcee Hastings (D–FL) and 2) Rep. Ileana Ros-Lehtinen (R–FL). The second panel had five witnesses: 1) Dr. John L. “Jack” Hayes, Assistant Administrator for Weather Services and Director, National Weather Service, National Oceanic and Atmospheric Administration (NOAA); 2) Dr. Kelvin K. Droegemeier, former Co-Chair, National Science Board Task Force on Hurricane Science and Engineering; 3) Dr. Shuyi Chen, Professor of Meteorology and Physical Oceanography, University of Miami, Rosenstiel School of Marine & Atmospheric Sciences; 4) Dr. David O. Prevatt, Assistant Professor, Department of Civil and Coastal Engineering, University of Florida; and 5) Dr. Stephen P. Leatherman, Director, International Hurricane Research Center, Florida International University.

Summary of Hearing

Chairman Lampson opened the hearing with a brief statement discussing the importance of the issue, citing the grave effects of such natural disasters, and the need to improve our forecasting and warning capabilities in order to save lives and mitigate property loss. Ranking Member Inglis, Chairman Baird, and Ranking Member Ehlers followed with opening statements echoing Chairman Lampson's remarks.

The first witness panel included Rep. Alcee Hastings (D–FL) and Rep. Ros-Lehtinen (R–FL). They both offered statements in support of H.R. 2407, and briefly outlined the current hurricane research being done in Florida. Following a brief recess, the hearing proceeded to the second panel.

Witnesses agreed on the need to implement a national coordinated hurricane initiative. Dr. Hayes testified that NOAA agrees with the overall goal of the bill, and supports a committee co-chaired by NSF and NOAA to oversee and coordinate federally-

funded research efforts. He also described the Hurricane Forecasting Improvement Project, or HFIP, that was recently developed by NOAA and addresses many of the items outlined in the bill language. Dr. Droegemeier highlighted the vulnerability of the energy infrastructure in the Gulf of Mexico and reiterated the urgency for further hurricane research. Dr. Chen emphasized the importance of universities in supplying the basic research and resources for developing an integrated forecasting system. Dr. Prevatt addressed the changes in infrastructure needed in order to mitigate the effects of winds and storm surges associated with hurricanes. He advocated for more research specifically addressing the infrastructural challenges that hurricanes present in order to minimize economic losses and reduce damage. Dr. Leatherman concluded the opening statements by summarizing the key research developments at the National Hurricane Center that address the many hazards associated with hurricanes, including storm-surge modeling, wind-engineering research and quantitative evacuation modeling.

During the discussion period, Chairman Lampson questioned the witnesses as to some of the challenges hindering better hurricane forecasting. Dr. Hayes cited the need for better observations to facilitate greater scientific understanding of hurricanes. Also, he expressed the need for funding that targets the transition of university research to operational status for the public. Congressman Baird asked the witnesses to prioritize their requested areas of funding. Dr. Hayes urged for more operational high-performance computing while Dr. Droegemeier emphasized the social aspect of hurricane forecasting, citing better communication with the public in eliciting an appropriate response. Dr. Prevatt and Dr. Leatherman both stressed the importance of developing a strong infrastructure and investing in research to better understand structural interactions with wind and water surges. Dr. Ehlers discussed with Dr. Prevatt and Dr. Leatherman the challenges that hinder changing building codes so as to make buildings more resistant to the hazards of hurricanes. Dr. Hayes concluded the hearing by answering Rep. Bartlett's questions about the dynamics of hurricanes, specifically the forces that drive intensity changes.

***4.4(s)—The Role of Non-governmental Organizations
and Universities in International Science and
Technology Cooperation***

July 15, 2008

Hearing Volume No. 110–114

Background

On Tuesday, July 15, 2008, the Honorable Brian Baird presiding, the Subcommittee on Research and Science held a hearing to examine the role of U.S. non-governmental organizations and universities in international science and technology cooperation, in particular relative to the role of the Federal Government, and to explore the diplomatic benefits of such cooperation.

There were four witnesses: 1) Dr. Alan Leshner, Chief Executive Officer, American Association for the Advancement of Science; 2)

Dr. Michael Clegg, Foreign Secretary, National Academy of Sciences; 3) Dr. William Wulf, Member of the Board of Directors, Civilian Research and Development Foundation; and 4) Dr. James Calvin, Interim Vice President for Research, Texas A&M University.

Summary of Hearing

Chairman Baird opened the hearing by talking about the many benefits of international science and technology (S&T) cooperation and the important role of non-profit organizations (NGO's) in facilitation S&T cooperation. Ranking Member Ehlers echoed Chairman Baird's remarks and cited the important history of United States S&T cooperation with the Former Soviet Union.

All of the witnesses also spoke about the importance of international S&T cooperation to our nation. Each of the witnesses testified out the respective role of his NGO or university in international S&T cooperation. Dr. Leshner spoke out the need to raise the profile of this issue and suggested that Congress could take a closer look at how the State Department evaluates their S&T agreements. He made the specific suggestion that there be an associate director with a clear international mandate at the White House Office of Science and Technology Policy. Dr. Clegg spoke about the many forums and mechanisms through which the National Academies promote international exchange and cooperation, and cited a recent Academies report that made a number of recommendations regarding the role of S&T at the U.S. Agency for International Development. Dr. Wulf testified about the history of the Civilian Research and Development Foundation (CRDF) and described CRDF as a "do-tank" as opposed to a think tank. He described the many programs at CRDF and how they complement those of government agencies such as NSF. Dr. Calvin spoke about the benefit of international exchange of students and scholars to his campus, as well as about his university's major international collaborations and its satellite campus in Qatar.

Chairman Baird asked about mechanisms for funding of foreign researchers with U.S. dollars. Dr. Leshner answered that such funding should be available in unique circumstances where the foreign collaborator has no access to resources in his/her own country. Dr. Calvin suggested that a higher priority might be to return to funding students from developing countries to study in the U.S. so they can help build an S&T infrastructure in their home country that makes such collaborations possible to start with. Dr. Wulf answered that CRDF does fund foreign researchers as part of collaborations with U.S. scientists and Dr. Calvin cautioned that we should not use a single model of collaboration for all countries. Rep. Ehlers expanded on his opening remarks. Rep. McNerney asked about the role of multinational corporations in international S&T cooperation and about maintaining standards for ethics and integrity in research collaborations with countries than have very different cultures from our own to which witnesses answered that there have been many international discussions about research ethics and progress is being made. Rep. Bilbray spoke about problems with the visa system and asked about international collaborations on water issues. The discussion returned to specific mechanisms for

funding international collaborations, including through bilateral S&T agreements. Witnesses agreed that there were pros and cons to money going through both the Federal Government and NGOs. Rep. Ehlers and witnesses clarified that resources for research include lab equipment, access to scientific literature and other research infrastructure as well as money. Rep. Carnahan asked about how the Department of State is using S&T for diplomacy. Witnesses made specific recommendations including increasing the number of scientists in U.S. embassies. Finally, Rep. Bilbray asked witnesses to comment on cooperative efforts in Central America.

4.4(t)—The Role of Social and Behavioral Sciences in Public Health

September 18, 2008

Hearing Volume No. 110–123

Background

On Thursday, September 18, 2008, the Honorable Brian Baird presiding, the Subcommittee on Research and Science Education held a hearing to examine the role of the social, behavioral and economic sciences in improving our nation's health and well being and reducing the economic burden of health care.

There were four witnesses: (1) Dr. Lisa Feldman Barrett, Professor of Psychology and Director, Interdisciplinary Affective Science Laboratory, Boston College, with appointments at Harvard Medical School and Massachusetts General Hospital; (2) Dr. John B. Jemmott, III, Kenneth B. Clark Professor of Communication, Annenberg School of Communication; Professor of Communication in Psychiatry; and Director of the Center for Health Behavior and Communication Research, Department of Psychiatry, School of Medicine, University of Pennsylvania; (3) Dr. Donald S. Kenkel, Professor of Policy Analysis and Management, College of Human Ecology, Cornell University; and (4) Dr. Harold G. Koenig, Professor of Psychiatry and Behavioral Sciences, Associate Professor of Medicine, and Director of the Center for Theology, Spirituality and Health, Duke University.

Summary of Hearing

Chairman Baird opened the hearing by emphasizing the importance of the hearing in light of the current health care crisis, and took a moment to acknowledge the contributions of retiring Subcommittee Staff Director, Jim Wilson. Rep. Ehlers also recognized Dr. Wilson's contributions and added that an understanding of human behavior and emotion can directly inform policy-making.

Witnesses agreed on the importance of behavioral, social, and economic science research and cited ways in which the findings of such research could contribute to the design of more effective health policies. Dr. Barrett explained her research on the relationship between people's "emotional literacy" and their social, academic, and professional behavior. She explained how findings of basic social science research can eventually lead to findings with both public health and economic benefits for the Nation. Dr. Jemmott detailed the process and findings of his research into the

social and psychological factors associated with HIV and risky sexual behavior. Dr. Kenkel explained ways in which health economics research can inform health care policies by improving understanding of how incentives, taxes or marketing restrictions affect certain behaviors that impact health, such as smoking and obesity. Dr. Koenig presented his research on the effects of religion and spirituality on health behaviors and choices, including cigarette use, length of hospital stays, and sexual practices.

During the discussion period, Dr. Barrett further discussed the emotional literacy training program that was developed out of her research, and Dr. Jemmott further explained the outcomes of programs and interventions on chronic disease prevention. Dr. Kenkel provided testimony on the specifics of incidents of addictive behaviors, and the impact of incentives in such cases. Dr. Koenig explained how his findings on religion and health could have practical applications. The Members and witnesses discussed how health and religion might be bound due to lifestyle trends for religious people, the possibility of a bias against religion in the scientific community, and whether there is a distinction, health-wise, between involvement in a religious community and simple spirituality. There was further emphasis on smoking advertising and cessation programs, sexual education programs, social science-health workforce and laboratory development, the demographic picture of HIV patients, and American obesity.

4.5—SUBCOMMITTEE ON SPACE AND AERONAUTICS

4.5(a)—The Federal Aviation Administration's R&D Budget Priorities for Fiscal Year 2008

March 22, 2007

Hearing Volume No. 110–15

Background

On Thursday, March 22, 2007, the Honorable Mark Udall presiding, the Subcommittee on Space and Aeronautics met to review the FY 2008 budget request for the Federal Aviation Administration's (FAA) research and development (R&D) programs and to examine current and potential R&D priorities, including support for the Next Generation Air Transportation System (NextGen).

Four witnesses testified: (1) Ms. Victoria Cox, Vice President for Operations Planning, Air Traffic Organization, Federal Aviation Administration; (2) Dr. R. John Hansman, Co-Chair, FAA Research, Engineering and Development Advisory Committee, Professor of Aeronautics and Astronautics, Director, MIT International Center for Air Transportation; (3) Dr. Donald Wuebbles, Chair, Workshop on the Impacts of Aviation on Climate Change, Department Head and Professor, Department of Atmospheric Sciences, University of Illinois–Urbana Champaign; and (4) Mr. Steve Alterman, President, Cargo Airline Association, Chairman, Environment Subcommittee, FAA Research, Engineering and Development Advisory Committee.

Summary of Hearing

Chairman Udall noted that the hearing is timely because FAA reauthorization is due in 2007. He spoke of his concern over NASA's reduced funding commitment to aeronautics research. He also noted that the impact of aviation on climate change is receiving increasing attention. Representative Calvert seconded concerns about NASA's research, and wondered whether FAA's research funding is adequate.

Ms. Cox said that NextGen will enable support of a three-fold increase in airspace demand by 2025. The Operational Evolution Partnership, (OEP), planning document will be published in June. Dr. Hansman reported that the airspace is being stressed by current demand, and delays have been increasing. He was concerned about the loss of national capability in applied aeronautics. He was also concerned about the FAA's capability to quickly implement new technologies. Dr. Wuebbles chaired a workshop on the impacts of aviation on climate change last summer. The workshop conclusion was that further research is warranted, because of the potentially serious impact and because there is much uncertainty. Mr.

Alterman agreed with concerns about NASA research, implementation speed, and aviation environmental impact. He promoted the benefits of improved operational procedures such as Continuous Descent Arrivals.

During the question and answer period, Dr. Hansman agreed with Ms. Cox's comment that human factors research will be important for NextGen. Mr. Alterman endorsed ADS-B implementation. He predicted that environmental constraints will prove more binding than capacity constraints. Dr. Hansman said that some research areas have been under funded, such as aircraft icing, fire protection, terminal area safety, and safety-critical software.

Representative Rothman was concerned that airspace usage might some day fill the skies, degrading quality of life. He was particularly concerned about aviation noise. Dr. Wuebbles said that the amount of funding for research on the effects of aviation on climate is "essentially zero." Representative Rohrabacher said that he felt aviation emissions research should emphasize the health of the population today rather than emphasize global climate change. Representative Calvert wondered if the speed of replacement of older, louder and more polluting, aircraft could be increased with some sort of incentives. Dr. Hansman worried that NASA is under funding innovation.

In Questions for the Record, Mr. Alterman said he expects the FAA will have to mandate equipage for NextGen. He felt that the FAA, not the Joint Planning and Development Office (JPDO), should be in charge of NextGen implementation. Ms. Cox reported that the FY 2007 Operating Plan will not drive any adjustments to the FY 2008 R&D plan. The FY 2008 plan includes an additional \$10M request for NextGen research on wake vortex and on human factors. About \$18 million is being spent by the FAA on aviation environmental research. The FAA plans to support routine unmanned aircraft systems (UAS) access to the national airspace system (NAS) within the 2012–2015 timeframe. Dr. Hansman said that the REDAC would recommend increasing support for UAS research. Dr. Wuebbles encouraged the FAA to develop stronger interactions with the academic community.

***4.5(b)—The Joint Planning and Development Office
and the Next Generation Air Transportation Sys-
tem: Status and Issues***

March 29, 2007

Hearing Volume No. 110–18

Background

On Thursday, March 29, 2007, the Honorable Mark Udall presiding, the Subcommittee on Space and Aeronautics held a hearing to examine the status of the Next Generation Air Transportation System initiative (also known as NGATS or NextGen) and explore key issues related to the initiative and the interagency Joint Planning and Development Office (JPDO).

Four witnesses testified: (1) Mr. Charles Leader, Director, Joint Planning and Development Office, Federal Aviation Administration (FAA); (2) Dr. Gerald L. Dillingham, Director, Physical Infrastruc-

ture Issues, Government Accountability Office; (3) Hon. John Douglass, President and CEO, Aerospace Industries Association; and (4) Dr. Bruce Carmichael, Director, Aviation Applications Program, Research Applications Laboratory, National Center for Atmospheric Research.

Summary of Hearing

In his opening remarks, Chairman Udall noted delays in NextGen developments since last year's hearing. He spoke with concern about NASA's uncertain commitment to its aeronautics program, and NextGen management continuity. Mr. Leader reported that two fundamental NextGen technologies are already beginning implementation: Automatic Dependence Surveillance Broadcast, (ADS-B), and System Wide Information Management, (SWIM). The DOD, DHS and the FAA are each contributing \$5 million to a SWIM demonstration this year. He mentioned the near-term release of three important NextGen documents: the Concept of Operations, the Enterprise Architecture, and the Integrated Work Plan. He spoke of the importance of weather research.

Dr. Dillingham discussed JPDO's organizational structure, technical planning, and research funding. He felt that the FAA and JPDO must address the factors that have contributed to the frequent turnover of its JPDO senior management. He urged the JPDO to involve all stakeholders, including active traffic controllers and technicians. Mr. Douglas noted that industry is an essential partner in NextGen and it is important that industry have confidence that the government is committed to NextGen. Dr. Carmichael stated that seventy percent of delays in today's system are attributable to weather. NextGen will integrate the weather programs of the FAA, DOD and NOAA. Dr. Carmichael said that NASA would be a logical weather research partner but doesn't have much funding for it.

Representative Rothman voiced his concern that extreme growth of aviation could erode the quality of life. Representative Calvert spoke of his disappointment in NASA's decreased aeronautics activity.

In the question and answer period, Chairman Udall inquired where additional research funding could be most useful. Mr. Leader answered that safety related issues, human factors, a safety system that is predictive rather than forensic, automation issues and wake vortex work could all use an increase in resources. Dr. Dillingham spoke of the importance of NASA aeronautics facilities. Mr. Douglas agreed, and also spoke of the importance of systems engineering, wake vortex and weather research. Mr. Douglas noted that weather research benefits the Department of Defense, too.

Dr. Dillingham noted that his organization has a study underway addressing the incorporation of unmanned aircraft systems into the air system.

In the questions for the record, Dr. Dillingham was asked if the JPDO should be moved out of the FAA for greater visibility and authority. He felt it should not be, but he suggested having the JPDO director report directly to the FAA Administrator, and making the director an Associate Administrator. He felt that the JPDO should not report to the Secretary of Transportation because that could re-

move it too far from program implementation. He endorsed Mr. Douglas' suggestion that agencies cooperating with the JPDO should designate a senior program official for JPDO management. He also felt that the Senior Policy Committee should hold regularly scheduled meetings.

Mr. Douglas felt that the NGATS Institute hadn't developed industry partnership adequately, and this slowed the development of the Concept of Operations. He noted that research and development is key to the success of NextGen; however, NASA is the only agency capable of conducting the required research and development a timely manner. He reported that the AIA believes that a business case for necessary equipment by industry is necessary, and "a combination of operational and perhaps financial incentives should be considered."

Mr. Leader reported that the first segment of SWIM will be complete in 2013. The deployment across the NAS of ADS-B is planned to be completed by 2013. The FAA plans to maintain 50 percent of the current system of secondary radars at high-density locations to serve as a back-up. The FAA anticipates reducing, but not eliminating, both VOR and ILS equipment. Some private sector involvement in the provision of key NextGen capabilities is likely.

***4.5(c)—NASA's Space Science Programs: Review of
Fiscal Year 2008 Budget Request and Issues***

May 2, 2007

Hearing Volume No. 110-24

Background

On Wednesday, May 2, 2007, the Honorable Mark Udall presiding, Subcommittee on Space and Aeronautics held a hearing to examine the National Aeronautics and Space Administration's (NASA) Fiscal Year 2008 budget request and plans for space science programs including heliophysics, planetary science (including astrobiology), and astrophysics, as well as issues related to the programs.

There were five witnesses: (1) Dr. S. Alan Stern, Associate Administrator, NASA Science Mission Directorate; (2) Dr. Lennard Fisk, Thomas M. Donahue Distinguished University Professor of Space Science, University of Michigan and Chair, Space Studies Board, National Research Council; (3) Dr. Garth Illingworth, Professor, University of California Observatories/ Lick Observatory, University of California, Santa Cruz and Chair, Astronomy and Astrophysics Advisory Committee; (4) Dr. Daniel Baker, Professor of Astrophysical and Planetary Sciences and Director, Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder; and (5) Dr. Joseph Burns, Irving Porter Church Professor of Engineering, Professor of Astronomy and Vice Provost of Physical Sciences and Engineering, Cornell University.

Summary of Hearing

Both Chairman Mark Udall (D-CO) and Ranking Member Ken Calvert (R-CA) opened with concerns about NASA's expanding financial needs, which likely will not be met by the organization's

shrinking budget, and with hopes of addressing how Congress and NASA could work together to allow NASA to reach its goals in 2008 and beyond.

In his testimony, Dr. Stern noted a list of the improvements he has implemented in NASA since taking his position and expressed a desire to increase the efficiency of scientists within the agency. Dr. Fisk was primarily concerned with the Space Science Mission Directorate, and he cited some primary strategic goals for the SMD program. Dr. Illingworth agreed that NASA should be given a larger budget, but only under the condition that NASA more effectively estimate costs. Dr. Baker explained the biggest difficulties facing the heliophysics program, and argued that investments in more small scale missions and restoring the Explorer mission line budget could help address these problems. He also called for a larger budget.

Rep. Calvert asked how mission costs could be reduced. Dr. Stern replied that Administer Griffin's new policy, requiring a 70 percent confidence level in estimates, will greatly reduce mission costs. He also stated they were implementing a minimum experience level for project leaders. Mr. Calvert stressed the immense problems that cost underestimation can cause.

Mr. Udall asked Dr. Stern if he had any suggestions for lowering NASA costs. Dr. Stern suggested PIs involved in any project should lessen their other professional responsibilities, primarily focusing on the NASA project until it is completed. He added that he felt it was important to always simplify project efforts, making adjustments that will keep the project on schedule.

When Mr. Udall asked the panel about appropriations priorities for 2008, the panelists agreed that research and analysis and small scale missions that big returns and get the community excited about NASA were crucial to securing NASA's success as an organization. Dr. Fisk added that not only does R&A funding need to be increased, but that this program cannot be adequately funded without increasing NASA's total budget.

Witnesses agreed that 25 percent of NASA's budget should be allotted to R&A.

In response to Mr. Udall's inquiries, the panel agreed that international collaboration could answer some of NASA's budgeting problems by relieving some of NASA's individual load of responsibility. However, all panelists cited ITAR as a possible roadblock in working with other nations. Dr. Illingworth noted that small-scale projects would be especially productive collaborations. The witnesses expanded on this idea, addressing cooperation with China's emerging space program.

Mr. Rohrabacher asked how astronomy impacts decisions made on Earth. Dr. Fisk explained that we do not see 99 percent of the universe, and knowing even a small portion more would certainly enhance knowledge of our own world, which is governed by the same laws of physics as the rest of the universe. Citing the discovery of electricity, Dr. Stern argued that while knowledge of basic science may, at first, seem to have little application, it can cause huge changes in the economy, standard of living, and so on. Rep. Rohrabacher expressed concern about plans to shut down the Arecibo radio telescope, which can forewarn us of near-Earth objects;

Dr. Burns shared the concern, as he is personally associated with the telescope.

4.5(d)—Building and Maintaining a Healthy and Strong NASA Workforce

May 17, 2007

Hearing Volume No. 110–31

Background

On Thursday, May 17, 2007, the Honorable Mark Udall presiding, Subcommittee on Space and Aeronautics held a hearing to examine National Aeronautics and Space Administration (NASA) workforce issues and the recommendations of independent review panels for ensuring the health and vitality of the NASA workforce in the 21st century. This was the first in a series of NASA workforce hearings. Later hearings will address Shuttle transition workforce issues and specific legislative proposals.

The witnesses included: (1) Ms. Toni Dawsey, Assistant Administrator for Human Capital Management, NASA; (2) Mr. John G. Stewart, Fellow at the National Academy of Public Administration, Member of NASA's Multisector Workforce Panel; (3) Dr. David Black, Co-Chair, National Research Council's Committee on Meeting the Workforce Needs for the National Vision for Space Exploration; and (4) Dr. Lee Stone, Legislative Representative, NASA Council of IFPTE Locals, International Federation of Professional and Technical Engineers.

Summary of Hearing

Chairman Udall opened by emphasizing NASA's need to attract, cultivate and retain the most technically and creatively skilled workers, and that this cannot be accomplished without sufficient financial resources. Ranking Member Hall noted the importance of constant reevaluation and strong workforce development in light of current and anticipated challenges to the NASA program.

Ms. Dawsey testified that the NASA Workforce Strategy stresses building and sustaining healthy centers, maximizing human capital, and evolving a more flexible, workforce. She said that NASA's plan is based on three goals to implement these principles: understanding mission requirements, aligning workforce skills with mission needs, and, finally, enabling more efficient human resources operations. Mr. John G. Stewart detailed the NASA's Multisector Workforce Panel's six recommendations for improving NASA's workforce. Mr. Black suggested an emphasis more hands-on skill training, particularly in systems engineering and program project management. Dr. Stone focused on budget issues, noting that NASA's staff and relative budget are much smaller than in the 1960s and calling the current state a "fiscal crisis." He also discussed the reduction of NASA's older workforce, which he believed is an unnecessary goal, and offered seven recommendations from the IFPTE for improving NASA's workforce.

During the discussion period, the Members and witnesses focused on the age demographics of the NASA workforce, NASA's response to workforce recommendations, and possibilities for future

funding. There was an emphasis on recruiting young talent, and though the panelists disagreed on how to handle the older workforce, all agreed that recruiting a young workforce was essential for the success of NASA's programs. In addition, a specific and clear vision for future agency activity and inspiring the Nation's youth are the key components to ensuring a productive 21st century for NASA.

4.5(e)—NASA's Earth Science and Applications Programs: Fiscal Year 2008 Budget Request and Issues

June 28, 2007

Hearing Volume No. 110-44

Background

On Thursday, June 28, 2007, the Honorable Mark Udall presiding, the Subcommittee on Space and Aeronautics held a hearing to examine the National Aeronautics and Space Administration's (NASA) Fiscal Year 2008 budget request and plans for the Earth science and applications programs, and issues related to the programs.

There were four witnesses: (1) Dr. Michael H. Freilich, Director, Earth Science Division of the Science Mission Directorate for NASA; (2) Dr. Richard A. Anthes, President of the Universities Corporation for Atmospheric Research, (3) Dr. Eric J. Barron, Dean of Jackson School of Geosciences at the University of Texas, Austin; (4) Dr. Timothy W. Foresman, President of the International Center for Remote Sensing Education.

Summary of Hearing

First, Dr. Freilich testified that NASA's primary Earth science goal is "to advance Earth systems science and to use this understanding sufficiently to address societal issues." Dr. Anthes stated that the highest priority is that "NASA commit to and begin to implement its recommended decadal missions," which he identified as extremely relevant to current warming and climate problems. Dr. Barron believes climate change research is essential to NASA's Earth science program, and stated that the current NASA budget could not possibly address all of the necessary recommendations of the Decadal Survey, advocating an increase in the NASA budget. Lastly, Dr. Foresman's testimony focused primarily on the Earth Science Application Program's failure to gain ground on technological applications of Earth-monitoring, such as Google Earth and World Wind, and encouraged NASA to be at the forefront of these kinds of technologies.

When asked by Chairman Udall (D-CO) whether they saw an appropriate balance in the Earth Science budget, both Dr. Anthes and Dr. Barron agreed that though there is balance in the appropriation of funds within the budget, that budget is extremely limited. Dr. Barron, at several instances, reinforced that a major problem facing NASA's Earth science program is an inconsistency of measurements. He explained that if NASA is under-funded, and certain data is taken sporadically, as opposed to in a continuous fashion, it is likely that the previous data will be useless, and

therefore a further waste of NASA's funds. Dr. Freilich agreed with this concern, saying, "it is essential for us to redeem the Nation's previous investment in these time series by continuing them where necessary."

Congressman Lampson asked a long line of questions, initially dealing with the NASA-NOAA joint projects, which, according to the panel, are facing funding difficulties within both organizations. He was also curious as to why the follow-on for the QuikSCAT satellite, which monitors hurricanes, was postponed until 2013. Dr. Barron responded that the Decadal Survey was aware of the budgetary restraints of NASA and had to prioritize, putting important projects such as the follow-on aside for even higher priority projects.

Chairman Udall asked whether the land cover data record would be consistent or if there would be a gap before the launch of the LDCM. Dr. Freilich responded that though there would be a gap and NASA was attempting to minimize that gap to no more than 6-12 months.

All panelists were supportive of some kind of international collaboration on Earth Science research and applications, and Congressman Tom Feeney (R-FL) asked whether international collaboration on projects would be hindered by ITAR. Dr. Freilich offered that the scope of the problem necessitated international cooperation, and that the challenges of ITAR were hinder some, but surmountable, listing several examples of successful NASA collaborations with foreign nations. Dr. Anthes warned that we cannot rely entirely on international partnerships, stating "It would be like having a military that relied on international partnerships."

Dr. Freilich explained that the Earth Science Applied Science division is working with U.S. Group on Earth Observations to use the information gathered by NASA for societal benefit. Dr. Foresman elaborated with insights into applications of the program, especially web applications and visualization tools that would help to monitor the number of trees in an area, to prevent deforestation, and even to help with humanitarian issues, such as the genocide in Darfur. He believes that monitoring systems similar to those developed by Google could be unsurpassed in their ability to quicken the U.S. response to such issues.

Chairman Udall closed the hearing with inquiry on how NASA plans to implement the suggestions from the Decadal Survey, the ongoing NPOESS Nunn McCurdy changes, and international collaborations. He was also curious as to the timeline for these projects. Dr. Freilich responded that though the 2008 budget has already been developed, NASA plans to address the input of all three in the 2009 budget.

**4.5(f)—NASA's Space Shuttle and International
Space Station Programs: Status and Issues**

July 24, 2007

Hearing Volume No. 110-48

Background

On Tuesday, July 24, 2007, the Honorable Mark Udall presiding, the Subcommittee on Space and Aeronautics held a hearing to examine the National Aeronautics and Space Administration's (NASA) Fiscal Year 2008 budget request and plans for the Space Shuttle and International Space Station (ISS) programs, the status of the programs, and issues related to the programs.

There were four witnesses: (1) Mr. William Gerstenmaier, Associate Administrator for the Space Operations Mission Directorate at NASA; (2) Mr. Tommy Holloway, Chairman of the ISS Independent Safety Task Force; (3) Dr. G. Paul Neitzel, Professor of Fluid Mechanics at the Georgia Institute of Technology; (4) Ms. Christina Chaplain, Director of Acquisition and Sourcing Management for the Government Accountability Office.

Summary of Hearing

Chairman Udall raised concerns about the budget cuts for NASA during this critical time for the International Space Station (ISS) and Space Shuttle program. He also expressed concern regarding NASA's lack of a well defined research plan for the ISS. Ranking Member Feeney echoed Chairman Udall's concerns about funding, discussed future alternatives to the Space Shuttle, and stressed how important space exploration is to the United States and the world.

Mr. Gerstenmaier provided testimony on the activities aboard the ISS and how they directly support the future of space exploration. In his testimony Mr. Holloway reported on the observations and recommendations of the International Space Station Independent Safety Task Force. Dr. Neitzel discussed the concerns of the external research community regarding the ISS and Shuttle programs in his testimony. Ms. Chaplain's testimony focused on the challenges faced by NASA in completing and sustaining the International Space Station and retiring the Space Shuttle, and she focused on delays in the Shuttle launch schedule and the replacement of the Shuttle.

Chairman Udall and Ranking Member Feeney had questions about the logistical support for the ISS and the Commercial Orbital Transportation Services (COTS) program. The panelists agreed that logistical support is an issue and that depending entirely on COTS would be a mistake. Ranking Member Feeney also focused on the possibility of debris hitting the ISS, which Mr. Gerstenmaier confirmed as a possible hazard and discussed the different methods utilized to avoid debris.

Rep. Nick Lampson focused on the status of the Alpha Magnetic Spectrometer (AMS). Mr. Gerstenmaier expanded on the inability to fly AMS to the ISS saying that due to the *Columbia* accident and the reconstituted Shuttle flight manifest, NASA had to delete

the AMS from the ISS. Dr. Neitzel commented on the potential fallout with international partners due to not using the device on the ISS. Rep. Rohrabacher asked questions regarding the research done on the ISS and how the station is being utilized. The discussions focused on research being limited due to a limited budget and using the ISS and international partners as a way to increase the pool of money available. Dr. Neitzel mentioned that there is very little funding currently available for research and that the timeline would be prohibitive, but with additional funding it could be possible to revitalize some of the research that was originally planned to be done on the ISS.

Rep. Lampson then focused questions on a variety of issues regarding the schedule of the Shuttle launches. Mr. Gerstenmaier felt that the United Space Alliance worker strike would not affect the Shuttle launch schedule and that in general there were sufficient contingency plans to prevent changes in the schedule. The panel was in agreement that with the proper funding from Congress it was still possible to add an additional Shuttle flight, but that as time passed it became increasingly difficult. Ranking Member Feeney had questions on whether it was technically feasible to have additional space Shuttle flights and Mr. Gerstenmaier assured him that the problem was with the budget; the Space Shuttle was not entirely necessary for future flights. Rep. Lampson asked about plans for Shuttle contingency flights and the witness panel agreed that the two contingency flights should be considered as part of the baseline schedule.

Ranking Member Feeney's final question was with regards to how NASA can make the transition of employee and workforce skills as seamless as possible leading into future missions. The witness panel was in agreement that all of the skills from personnel involved in the ISS were valuable skills that would be essential to future missions. Their main concern was in the ability to retain these people and their skill sets.

Chairman Udall's final questions focused on the Status of the Hubble Servicing Mission. Mr. Gerstenmaier felt that the teams were well prepared for the mission thanks to their experience on the ISS. He did not foresee any threats to delaying the launch date for this particular mission as it was more likely that Shuttle missions would be pushed back.

***4.5(g)—NASA's Astronaut Health Care System—
Results of an Independent Review***

September 6, 2007

Hearing Volume No. 110-52

Background

On Thursday, September 6, 2007, the Honorable Mark Udall presiding, the Subcommittee on Space and Aeronautics held a hearing to examine the results of two reports on the National Aeronautics and Space Administration's (NASA) astronaut medical and behavioral health care system. The first, the report of the NASA Astronaut Health Care System Review Committee, provided an independent assessment of NASA's medical and behavioral health care

system. The second, a Johnson Space Center internal review considered opportunities for lessons learned in light of the incident involving NASA astronaut Lisa Nowak. The hearing explored the findings and recommendations of these reports and any actions NASA planned to take in response to them.

The first panel had four witnesses: (1) Col. Richard E. Bachmann, Jr., Chair of the NASA Astronaut Health Care System Review Committee and the Commander and Dean of the U.S. Air Force School of Aerospace Medicine; (2) Dr. Richard S. Williams, Chief Health and Medical Officer of NASA; (3) Dr. Ellen Ochoa, Director of Flight Crew Operations at NASA Johnson Space Center; (4) Mr. Bryan O'Connor, Chief of Safety and Mission Assurance at NASA. The second panel had one witness: Dr. Michael Griffin, Administrator for NASA.

Summary of Hearing

Chairman Udall emphasized that it is critically important that NASA provides astronauts with the best possible medical and behavioral care and quoted some of the concerns that arose from an independent review panel. Ranking Member Feeney echoed Chairman Udall's concerns and also expressed concerns regarding flight surgeons and astronauts being hesitant to report major crew medical or behavioral problems. Full Committee Chairman Gordon and Full Committee Ranking Member Hall both expressed similar concerns and thanked the Subcommittee for holding the hearing.

Col. Bachmann provided testimony regarding the findings of the NASA Astronaut Health Care System Review Committee. Dr. Williams' testimony provided insight into the NASA Astronaut Medical and Behavioral Health Care Program and their plans regarding the NASA Astronaut Health Care System Review Committee and the internal review at Johnson Space Center. In her testimony, Dr. Ochoa went into detail about her experience in preparing for space missions and how seriously all astronauts and flight surgeons take their preparation. Mr. O'Connor testified on the subject of space flight crew safety.

Chairman Udall asked Col. Bachmann about the contrast between the review committee's findings and Dr. Williams' testimony. Col. Bachmann elaborated on the reasoning behind their findings, but could only speculate at the reason for a difference in their testimonies.

Ranking Member Feeney asked about alcohol being a problem leading up to a mission. Mr. O'Connor confirmed that if a member of the crew was impaired it would be a problem, but that it was highly unlikely for that occur. Ranking Member Feeney also had a question regarding the differences seen between the two different studies. Mr. O'Connor accredited this to the different ways that the studies were performed.

Ranking Member Hall had a string of questions and discussions with Mr. O'Connor regarding the scope of Mr. O'Connor's investigation, the lack of anonymity of the survey, Mr. O'Connor's belief that there has ever been any alcohol abuse, and about the policies in place at NASA to ensure employee openness.

Rep. Lampson established that Col. Bachmann's committee could not determine how extensive any alcohol problems were. Rep.

Lampson and Rep. Bonner asked questions regarding how open the astronauts were in their safety recommendations. Col. Bachmann and Dr. Ochoa felt that the survey was representative of how the astronauts felt and that there were sufficient programs in place to allow astronauts to provide feedback.

In the second panel, Dr. Michael Griffin testified about the importance of holding NASA's workforce to the highest personal conduct standards, about steps being taken to provide for the behavioral health of astronauts, and about the alcohol abuse allegations.

Chairman Udall's questioning was largely a discussion with Dr. Griffin about recommendations based on previous surveys and the plans for future surveys. Dr. Griffin made it clear that a major priority for him is to have an atmosphere where NASA astronauts and flight doctors are comfortable bringing up concerns.

Ranking Member Feeney asked about how some of the problems related to safety might be cultural problems. Dr. Griffin agreed that this could be a problem and that they are working to fix all of those issues.

Ranking Member Hall asked questions regarding how authentic the reports were from the various anonymous surveys. Dr. Griffin agreed that there wasn't much more that he could do other than to encourage employees to come forth with concerns or issues. Full Committee Chairman Gordon and Dr. Griffin concluded the hearing with a brief discussion regarding the charter of the NASA Astronaut Health Care System Review Committee.

4.5(h)—Near-Earth Objects (NEOs)—Status of the Survey Program and Review of NASA's Report to Congress

November 8, 2007

Hearing Volume No. 110-72

Background

On Thursday, November 8, 2007, the Honorable Mark Udall presiding, the Subcommittee on Space and Aeronautics held a hearing to examine the status of NASA's Near-Earth Object survey program, review the findings and recommendations of NASA's report to Congress, *Near-Earth Object Survey and Deflection Analysis of Alternatives*, and to assess NASA's plans for complying with the requirements of Section 321 of the *NASA Authorization Act of 2005*.

The first panel had one witness: the Honorable Luis G. Fortuño, Resident Commissioner, Puerto Rico. The second panel had six witnesses: (1) Dr. James Green, Science Mission Directorate, NASA; (2) Dr. Scott Pace, Program Analysis and Evaluation, NASA; (3) Dr. Donald K. Yeomans, Jet Propulsion Laboratory; (4) Dr. Donald B. Campbell, Cornell University; (5) Dr. J. Anthony Tyson, University of California, Davis; (6) Mr. Russell "Rusty" Schweickart, B612 Foundation.

Summary of Hearing

Chairman Udall was troubled by one NASA witness's statement that NASA would, at Congress's request, implement a more aggressive NEO program, because Congress has already made an unam-

biguous request of NASA to do this. Ranking Member Feeney explained that NASA cannot currently afford to run the NEO program on the scale that has been requested by Congress. He found it concerning that Arecibo's NSF funding is dwindling, as this observation device is an important tool of the NEO program.

Rep. Fortuño's testimony endorsed continuing efforts at the Arecibo facility, stating that he introduced H.R. 3737 to insure that NASA and NSF collaborate to continue funding. Ranking Member Feeney asked Rep. Fortuño the economic impact on Puerto Rico if Arecibo is closed and Rep. Fortuño estimated \$50 million for the area.

Dr. Green explained that the number of NEO's detected by NASA is already approaching the 90 percent discovery goal, referring to large NEOs, not those in the 140 meter range. He said that in NASA's report to Congress, the agency supported continuing the program, looking for potential dual use ground-based telescopes as well as partnering with other agencies. Rep. Lampson questioned whether international space agencies were concerned with NEO's, and Dr. Green responded that despite the fact that they are not currently carrying out detection programs, they certainly discuss it.

Dr. Pace stressed that NASA cannot initiate a new program beyond Spaceguard due to budget constraints. He stated that to reach the 90 percent goal would require new data management infrastructure and a dedicated facility. NASA has outlined a NEO survey program that could be implemented by 2020, but he warned that the proposed budget for this project would need more rigorous analysis. He said that without augmentation, the NEO Spaceguard survey program is unable to satisfy the requirements of the Authorization Act.

Dr. Yeomans indicated that the largest efforts of the NEO's program should be directed at the more abundant large asteroids. He said detecting all asteroids of this size is not a realistic expectation of the survey program, in its current form. He was optimistic that a number of existing technologies can deflect an Earth-threatening asteroid if given enough time.

When asked by Mr. Lampson whether the 2020 deadline for 90 percent detection of NEOs 140 meters and larger was realistic, Dr. Yeomans responded that 2030 would be a more likely, but still acceptable, date.

Dr. Campbell made clear that radar measurements are the best means to survey the characteristics of NEOs. If Cornell cannot find funds to keep the Arecibo Observatory open, he explained, it will likely be closed after 2011, and replacing this facility would cost several hundred million dollars.

Dr. Tyson said having a survey system would change the probabilistic worry of near-Earth object collisions to an actionable situation. He stated that the investment is comparatively small in light of the potential benefits. He suggests the Large Synoptic Survey Telescope Project as an answer to this dilemma, which would be capable of providing orbits for 82 percent of hazardous objects larger than 140 meters after 10 years of operation.

Mr. Schweickart argued that NASA had completely ignored Congress's direction to recommend a search program and supporting budget, and that the President had signed this request into

law. He suggested that NASA again be directed to comply with this law, that NASA investigate deflection of more frequent and smaller NEO's, and that NASA's report was flawed in its failure to understand that a primary deflection and a potential secondary deflection are necessary to remove NEO's from a path towards Earth. Mr. Schweickart also posited that NASA should submit a new report to Congress, execute a demonstration asteroid deflection mission, and take over duties of technological developments to be used for protecting the Earth from NEO impacts.

When asked by Congressman Rohrabacher which agency should be responsible for deflection efforts in the event of a hazardous object being on an orbit towards Earth, Mr. Tyson suggested Congress should hold hearings to get a number of opinions before making that decision.

Rep. Rohrabacher and Mr. Schweickart agreed that NEOs are an issue of public safety which cannot be ignored. Mr. Schweickart and Ranking Member Feeney also concluded that NASA ignored the more complex issue of dealing with smaller asteroids, which are statistically much more likely to need to be deflected, in favor of positing the use of nuclear weapons to deflect larger asteroids, which only pose a problem once every 100,000 years. All of the witnesses supported the idea of multiple forms of detection and were opposed to the closing of Arecibo. They suggested NASA form partnerships with NSF and other agencies to fund these detection operations.

4.5(i)—NASA's Fiscal Year 2009 Budget Request

February 13, 2008

Hearing Volume No. 110-75

Background

On Thursday, March 13, 2008, the Honorable Mark Udall presiding, the Subcommittee on Space and Aeronautics held a hearing to examine the National Aeronautics and Space Administration's (NASA) Fiscal Year 2009 budget request and plans for science programs including Earth science, heliophysics, planetary science (including astrobiology), and astrophysics, as well as issues related to the programs.

There were five witnesses: (1) Dr. S. Allen Stern, Associate Administrator, NASA Science Mission Directorate, (2) Dr. Lennard A. Fisk, Chair, Space Studies Board, National Research Council, (3) Dr. Berrien Moore III, Executive Director, Climate Central; Chair, Committee on Earth Studies, National Research Council, (4) Dr. Steven W. Squyres, Professor of Astronomy, Cornell University, (5) Dr. Jack O. Burns, Professor, Center for Astrophysics and Space Astronomy, University of Colorado.

Summary of Hearing

Chairman Udall opened the hearing with concerns about the FY09 budget for NASA, which keeps program expectations high while reducing funding. The Chairman noted that while NASA's budget is only set to increase by one percent through fiscal year

2011. He also expressed discomfort with NASA taking funds from one program to fund another.

Ranking Member Feeney expressed similar anxieties, but in a slightly more positive tone, stating that the budget makes “a good effort at remedying a number of deficiencies that have been highlighted in recent years.” Yet he remained unconvinced that NASA could continue to prove U.S. dominance in space research and exploration without a budget that expresses “a willingness to pay the costs of achieving it.”

Dr. Stern, defending the budget, claimed that it sets specific program priorities, controls costs in those projects it targets, rebalances the agency towards a mix of small and large missions, and focuses efforts on finishing incomplete projects before beginning a second project in parallel. Dr. Fisk challenged the assertion that funding was adequate, yet commended the agency for “doing extremely well with what it has,” while there is so much more it “could be doing.” Dr. Moore critiqued the budget, saying that it “begins to address” imbalances in the agency, but that much more will need to be done “for many budget cycles to come.” He also echoed that the program is doing great things with limited resources, and pleaded that Congress increase funding over the Presidential recommendation to help the agency accomplish “what is expected of it.” Dr. Squyres urged that cuts to the Mars program be undone and restored to their levels under the FY08 *Congressional Appropriations Act*. Dr. Burns expressed misgivings that cuts to the NASA budget will be occurring during a period of great potential discovery.

During the question and answer session, Chairman Udall and Ranking Member Feeney’s questions centered on rising costs and further scheduling delays anticipated with a slimmer budget. Dr. Stern responded that cost-control measures and prioritization would focus agency energies on targeted programs before beginning new ones. The issue of ITAR restrictions on international collaboration was brought up by Ranking Member Feeney, and Dr. Burns and Dr. Squyres both expressed that the legislation may have unintended consequences in space R&D projects. Dr. Stern, in response to Rep. Rohrabacher’s concerns about collisions with near-Earth objects, clarified that Arecibo is not crucial to detecting these objects. Ranking Member Feeney brought up the newly restructured NPOESS project and its status, which Dr. Stern confirmed was improving, and Dr. Moore characterized as, after clearing many hurdles, finally seeing “the light at the end of the tunnel.” Ranking Member Feeney expressed concerns about the future of NASA’s workforce. The panel emphasized the importance of exposing university students to aspects of space research while developing creative ways to inspire younger students to pursue space careers.

4.5(j)—NASA’s *Exploration Initiative: Status and Issues*

April 3, 2008

Hearing Volume No. 110-90

Background

On Thursday, April 3, 2008, the Honorable Mark Udall presiding, the Subcommittee on Space and Aeronautics held a hearing to review the status of the National Aeronautics and Space Administration’s Exploration initiative and examine issues related to its implementation.

There were four witnesses: (1) Dr. Richard Gilbrech, Associate Administrator, Exploration Systems Mission Directorate, National Aeronautics and Space Administration; (2) Ms. Cristina Chaplain, Director, Acquisition and Sourcing Management, Government Accountability Office; (3) Dr. Noel Hinnners, Independent Aerospace Consultant; (4) Dr. Kathryn Thornton, Professor of Department of Science, Technology and Society & Associate Dean of the School of Engineering & Applied Science, University of Virginia.

Summary of Hearing

Chairman Udall opened the hearing by stating the goal of NASA’s Exploration Initiative as the “human and robotic exploration of the solar system.” He claimed the program has “suffered from chronic under funding.” Chairman Udall focused on not just finding new money for NASA but making sure it is effectively spent so that the initiative is both “sustainable and worth the money.” He argued for better NASA accountability and reporting before Congress and emphasized the need for international collaboration to avoid the “temptation to rerun a space race that we already won.”

Ranking Member Feeney characterized NASA as at the juncture of a “once-in-a-generation transformation” since the *Columbia* disaster. He encouraged NASA and the Committee to stick to the doable road map in front of them, as outlined in the President’s *Vision for Space Exploration*. He expressed concern at the loss of skilled workers between the retirement of the Shuttle and the beginning of the Constellation Program. Echoing Chairman Udall’s recommendation, and suggested a close working relationship with international partners to maximize benefits to the U.S.

Dr. Gilbrech urged support for the Congressional budget request and stated that “real progress” is being made on the Constellation Program. He noted the technical challenges of starting a new rocket program, and remarked that the GAO said last year that NASA is “making sound investment decisions” for Constellation.

Ms. Chaplain recommended NASA set technical requirements for their designs before they can define cost approximations and schedule timelines. She also pointed out the necessity of NASA having adequate flexibility to respond to technical challenges as they arise.

Dr. Hinnners suggested that NASA clarify its exploration priorities to reduce misunderstandings regarding the purpose of the Moon base. He also criticized the pay-as-you-go system as costing

more in the end and stated that it is “not at all clear that NASA can implement an effective lunar exploration program” with the current budget for exploration.

Finally, Dr. Thornton encouraged NASA moving beyond low-Earth orbit by using a “stepping stone” approach to reaching Mars. By establishing temporary outposts between Earth and Mars, each landing would “advance the science and technology needed for the next, more ambitious objective.” She emphasized that program requirements should first be set before budgets and schedules can be finalized.

The panel responded to a variety of questions from the Members during the question and answer session, including: the risks involved with CEV/CLV development, the potential to accelerate Constellation with increased funding, the necessity for stability in Congressional funding, the importance of putting humans in space and the ramifications of not allowing funding for research for Mars-only technology. The panel responded that the technical challenge to CEV/CLV development lies in the integration of all of the Orion components, that Constellation development cannot be appreciably accelerated with greater funding but the date could be made more firm, and that humans in space not only inspire future scientists but also allow for operations robots could not perform. All panelists emphasized the need for stability in Congressional funding of NASA to make the program effective. There was a mixed response on the Mars-restrictions in the budget, as Dr. Hinnners argued that Moon-based technology will have “relatively little applicability” to a Mars mission and Dr. Gilbreth countered that technology used on the Moon will “eventually some day pay off” for a mission to Mars.

4.5(k)—Remote Sensing Data: Applications and Benefits

April 7, 2008

Hearing Volume No. 110-91

Background

On Monday, April 7, 2008 at Centennial Hall, Colorado Springs, Colorado, the Honorable Mark Udall presiding, the Subcommittee on Space and Aeronautics held a hearing to examine the opportunities and challenges of using remote sensing data to benefit public and private sector activities including urban planning, natural resource management, national defense, and homeland security among other application areas.

The witnesses were divided into two panels. The first panel consisted of: (1) Jack Byers, Deputy Director and Deputy State Engineer, Colorado Division of Water Resources; (2) Simon Montagu, Customer Resource and Support Director, Denver Regional Council of Governments; (3) Manuel Navarro, Fire Chief, City of Colorado Springs; and (4) Frank Sapio, Director, Forest Health Technology Enterprise Team, U.S. Department of Agriculture Forest Service. The second panel consisted of: (1) Kevin Little, Director, Business Development, Intermap Technologies, Inc.; (2) Matthew O’Connell, President and Chief Executive Officer, GeoEye, Inc.; and (3) Jill Smith, President and Chief Executive Officer, DigitalGlobe, Inc.

Summary of Hearing

Chairman Udall opened by noting that remote sensing technology is often not given the attention it deserves, and that its application fields encompass homeland security, natural resource management and city planning, among others. His chief concern was improving the delivery of this data to local and federal authorities. Subcommittee Ranking Member Feeney suggested that he would like to hear more about how problems specific to his home State of Florida, such as population growth, wildfires, and land-use impacts could be alleviated with remote sensing data. Echoing comments made by the Chairman, Mr. Feeney noted the wide range of applicable fields where remote sensing plays an important role.

The first panel of witnesses presented the role remote sensing data plays with local governments and agencies. Mr. Byers touted remote sensing for its utility in efficient water management and explained how this technology is being used to classify vegetation, monitor water consumption, and resolve water rights disputes. Representing an urban planning group, Mr. Montagu focused more specifically on city-growth issues and how remote sensing enables effective long-range planning. He urged the Subcommittee to make this data more readily available and to continue to purchase important remote sensing data. Mr. Navarro emphasized the importance of this data for fire response services, but lamented that his department lacked the staff to fully utilize the data. Addressing forestry management concerns, Mr. Sapio highlighted the accurate, timely and cost effective results of remote sensing, and detailed how broad-, mid- and fine-scale resolutions assist in assessing forest health, potential fire fuel sources, and monitoring the risks from insects and disease.

Responding to Mr. Udall's question regarding the exact benefit of this technology, the panel noted its consistent and objective quality and its ability to provide a great deal of information at low cost. Ranking Member Feeney addressed two important issues: the potential "gap" in LANDSAT data before the 2011 data continuity mission, and the security and privacy restrictions of widely disseminating this data. The panel responded that covering the gap could be done, albeit at high cost. Regarding privacy, they suggested a delicate balance must be achieved between transparency and security. Despite some misgivings that the data could be misused by terrorist organizations, the general consensus was that the security concern is "critically important" and that a review and tracking process is in place to monitor data users. Responding to Mr. Udall's question about the federal role in remote sensing, the witnesses pointed out the superior staff, budget and technical capabilities of the Federal Government, and insisted that federal leadership regarding data collection and distribution are key to maintaining the effectiveness of remote sensing data.

The second panel of witnesses represented the commercial applications of remote sensing data in the private sector. Mr. Little contended that the most important aspect of this technology is that it is highly application-specific. Mr. O'Connell characterized the industry as strong and emphasized that the commercial sector provides lower cost data than large, government-funded satellite projects. Ms. Smith listed the variety of applications remote sens-

ing data has found on both federal and local levels, and emphasized that the government should not impede or compete with the private sector.

In the question and answer period, the accessibility and cost-effectiveness of commercial data were reiterated as their key advantage. Regarding Mr. Feeney's question about foreign competition, Mr. O'Connell pointed out that the industry is looking for a reliable commercial partnership with Federal and local governments, not a subsidy. When Mr. Udall brought up legislative regulations, the panel universally confirmed that good policies are in place and just need to continue to be enforced. All the panelists agreed that federal contracts remain an important part of the revenue stream for remote sensing data.

***4.5(l)—NASA's International Space Station Program:
Status and Issues***

April 24, 2008

Hearing Volume No. 110-96

Background

On Thursday, April 24, 2008, the Honorable Mark Udall presiding, the Subcommittee on Space and Aeronautics held a hearing to examine the status of the International Space Station (ISS) and issues related to its operation and utilization, including the planned and potential uses of the ISS to meet both NASA and non-NASA research needs.

The witnesses before the Subcommittee were assembled in two panels. The first consisted of: (1) Dr. Edward Knipling, Administrator, Agricultural Research Service, U.S. Department of Agriculture (2) Dr. Louis Stodieck, Director, BioServe Space Technologies, Aerospace Engineering Sciences, University of Colorado (3) Mr. Thomas B. Pickens III CEO, SPACEHAB, Inc (4) Dr. Cheryl Nickerson, Associate Professor, Center for Infectious Diseases and Vaccinology, The Biodesign Institute, Arizona State University. The second panel was composed of: (1) Mr. William Gerstenmaier, Associate Administrator, Space Operations Mission Directorate, National Aeronautics and Space Administration (2) Ms. Cristina Chaplain, Director, Acquisition and Sourcing Management, Government Accountability Office (3) Dr. Jeffrey Sutton Director, National Space Biomedical Research Institute.

Summary of Hearing

Chairman Udall opened the hearing by noting that International Space Station (ISS) development has been a time-consuming and frustrating process. His primary concern was ensuring that massive U.S. investment in the Station pays off in both commercial and research dividends. He also argued that the research community has suffered heavily due to budget cuts, and its restoration is a primary concern for NASA and the Nation. Continued access to the ISS after Shuttle retirement remains a critical component of long-term ISS success. Ranking Member Hall praised the achievement of the ISS but expressed concerns about NASA's commitment to the

two contingency flights, the safety of the Russian Soyuz vessel, and NASA's plans to maximize the research potential of the ISS.

The first panel presented to the Subcommittee the research achievements of ISS investments and their commercial applications. Dr. Knipling addressed how the study of cellular mechanics on the ISS can lead to improvements in agriculture, environment, and human health. Arguing that designating the ISS as a national laboratory is not enough, Dr. Stodieck offered three suggestions to the Subcommittee on how to improve the operations on board the ISS: a Congressionally-established independent organization to manage R&D on the ISS, increased funding for non-NASA agencies to use the ISS, and regular and frequent transportation to the Station. Dr. Nickerson commented on how studies of Salmonella on the ISS could have direct applications to improve human health on Earth, including new vaccines for Salmonella. Finally, Mr. Pickens pointed out the commercial benefits of microgravity studies which could have a wide array of medical applications, from treating diabetes and Parkinson's to Alzheimer's and cystic fibrosis.

During the question and answer period, the panel deemed consistency, or increases, in funding as the most important condition for continued productivity of the ISS. Ranking Member Hall brought up the possible competition between government or university research and commercial research projects, but the panel insisted that the two work together in relative harmony. Responding to Mr. Lampson's questions, the panel encouraged the Subcommittee to extend the commission of the ISS into 2020, when investments in research projects will be making significant returns. The panel also soothed Mr. Rohrabacher's concerns that the ISS is properly outfitted with appropriate equipment to produce the promised results.

The second panel detailed achievements of the ISS and how NASA can improve its productivity. Mr. Gerstenmaier highlighted the important role that ISS physics research plays in learning more about physical processes on Earth. Ms. Chaplain touted the program's achievements under pressure, but recommended that NASA remain flexible to minimize scheduling impacts and think out contingency plans to increase efficiency. Dr. Sutton noted the ISS's importance in biomedical research on the long-term effects of humans living in space.

Chairman Udall began the questioning of the second panel with concerns about the status of the two contingency flights to fly spare parts to the ISS. Mr. Gerstenmaier responded that the lifespan of certain parts can be difficult to project, and that both flights would be dedicated to launching "critical spares," allowing greater flexibility to the scheduled development of commercial flights to the ISS. He also addressed Mr. Hall's concerns about Soyuz safety, saying that Russia and the U.S. are both concerned about its safety features and are collaborating on the issue. Mr. Gerstenmaier demanded that an amendment to the INKSA legislation be "mandatory" for the summer if contract placement with Russian manufacturers is to be made in a timely manner. He also rejected Mr. Lampson's hope that the AMS could be flown to the ISS because spare parts have a higher priority. Responding to questions from Mr. Udall and Mr. Rohrabacher, Mr. Gerstenmaier emphasized

how mutual Russian-American interest in transporting American crews to the ISS requires that INKSA be amended to streamline the period after Shuttle retirement.

4.5(m)—NASA's Aeronautics R&D Program: Status and Issues

May 1, 2008

Hearing Volume No. 110-99

Background

On Thursday, May 1, 2008, the Honorable Mark Udall presiding, the Subcommittee on Space and Aeronautics held a hearing to review NASA's current Aeronautics R&D Program. The Members and witnesses examined what needs to be done to make it as relevant as possible to the Nation's needs, and the R&D challenges related to safety and environmental impacts.

There were four witnesses: (1) Dr. Jaiwon Shin, Associate Administrator, Aeronautics Research Mission Directorate, National Aeronautics and Space Administration; (2) Mr. Carl J. Meade, Co-Chair, Committee for the Assessment of NASA's Aeronautics Research Program, National Research Council, National Academies; (3) Mr. Preston A. Henne, Senior Vice President, Programs, Engineering and Test, Gulfstream Aerospace Corporation; (4) Dr. Ilan Kroo, Professor, Department of Aeronautics and Astronautics, Stanford University.

Summary of Hearing

Chairman Udall opened the hearing by emphasizing the importance of aviation to the Nation and lamented a lack of resources for NASA's aeronautics R&D program in recent years. He commented on the growing challenges facing the future of aviation and how NASA's aeronautics research can address those concerns. He also recognized the usefulness of the National Academies' Decadal Survey of Civil Aeronautics in forming a productive aeronautics R&D agenda for the future. Ranking Member Feeney discussed the historical achievements of aeronautics research conducted by the National Advisory Committee on Aeronautics (NACA) and NASA and the proper role of the Federal Government and NASA in carrying out aeronautics research. He emphasized the critical importance of R&D in support of the Next Generation Air Transportation System (NextGen) and of developing safer, more efficient, and more environmentally friendly aircraft.

Dr. Shin explained how NASA's aeronautics program implements the national aeronautics R&D policy by conducting fundamental research and how it supports the development of the NextGen system through a holistic approach that addresses all aspects of the system. Evaluating NASA's entire aeronautics program in light of the 51 key technical challenges contained in the Decadal Survey of Civil Aeronautics, Mr. Meade expressed a mixed position. He pointed out that while NASA's ARMD staff was competent the directorate had not responded appropriately to the Decadal survey recommendations and lacked sufficient funding to pursue all objectives. Mr. Henne described the increase in foreign competition as

a result of foreign nations' investments in aeronautics research and stressed the need for the U.S. Federal Government to invest in aeronautics R&D in order to maintain its leadership in the field. Dr. Kroo discussed the technical and environmental challenges facing the aviation industry, the need for continuing fundamental long-term research and new technology development, integrating the most promising technologies at the system level, and transitioning new technologies to practical use.

During the question and answer period, the panel noted that the most important aeronautics R&D priorities were technologies to reduce environmental impact, improve safety, and increase fuel efficiencies. Mr. Feeney, the Ranking Member, brought up the issue of restricting foreign access to valuable NASA aeronautics research, but the panel found that in today's global environment with international suppliers, the dividing line would be hard to define. Responding to Mr. Wu's question concerning the availability of wind tunnels in the United States, the panel explained that some wind tunnel testing must still be conducted in Europe and as a result the data produced could be available to others. Mr. Henne and Dr. Kroo emphasized that NASA's aeronautics R&D must incorporate more than basic research in order to meet the Nation's needs.

Dr. Shin addressed Mr. Feeney's concern that NASA's aeronautics R&D is too concerned with only meeting its own needs, and Mr. Meade responded to his questions on regulating unmanned aerial vehicles. Mr. Meade and Dr. Shin answered Rep. Rothman's inquiries into NASA's work to reduce aircraft noise and pollution and Europe's current capability in those areas. Answering Chairman Udall's question on NASA and the FAA's new aviation safety database activity, Dr. Shin spoke about the close collaboration between the airlines, the FAA, and NASA in sharing safety data in support of the project.

4.6—SUBCOMMITTEE ON TECHNOLOGY AND INNOVATION

4.6(a)—The National Institute of Standards and Technology's Role in Supporting Economic Competitiveness in the 21st Century: The Fiscal Year 2008 Budget Request

February 15, 2007

Hearing Volume No. 110–6

Background

On Thursday, February 15, 2007, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation held a hearing to consider the Administration's fiscal year 2008 (FY 2008) budget request for the National Institute of Standards and Technology (NIST). An Administration witness reviewed the President's priorities for NIST, and four additional witnesses commented on the budget request and the future direction of NIST.

The witnesses were: (1) Dr. William Jeffrey, Director, NIST; (2) Dr. R. Stanley Williams, Senior HP Fellow in Quantum Science Research, Hewlett-Packard Corporation; (3) Mr. Michael Borrus, General Partner, X/Seed Capital; (4) Mr. Peter Murray, Vice President, Welch Allyn, Inc.; and (5) Mr. Michael Ryan, President and CEO, TUG Technologies Corporation.

Summary of Hearing

The hearing covered the following issues: the alignment of priorities in the Administration's budget request with the goal of improving U.S. competitiveness; the processes used to determine the FY 2008 budget priorities; how the President's proposed doubling of the NIST budget should be reflected in NIST activities and priorities; the impact decreasing the funding for the Manufacturing Extension Program (MEP) by 56 percent would have on the services the program provides to small- and mid-sized manufacturers; and whether the President's proposed elimination of the Advanced Technology Program (ATP) is in-line with the goal of increasing U.S. competitiveness. Chairman Wu praised NIST for the vital work the agency's researchers perform to enable standards development and advance measurement science. Chairman Wu also stated that though he was pleased the Administration requested an increase for NIST's Scientific and Technical Research Services (S&TRS), he was distressed that MEP and ATP were once again neglected or ignored by the President's budget. He also expressed concern that NIST's plan to re-compete the MEP centers would dramatically interfere with the services they provide. Ranking Member Phil Gingrey noted that NIST's activities touch myriad sectors in the economy, and that their research enabled the devel-

opment of cutting-edge technologies. Dr. Gingrey also expressed concern about the cut in funding for MEP.

Dr. Jeffrey highlighted the average benefit-to-cost ratio of 44:1 of NIST research and user-facilities as evidence of the agency's considerable contributions to U.S. economic competitiveness. He noted that NIST worked with industry and others to identify critical measurement barriers to innovation and improve the transfer of knowledge from the NIST labs to industry and academia. Dr. Jeffrey stated that though the views of Congress and the Administration differed on MEP and ATP, NIST would carry out the programs effectively regardless of the final appropriation. He justified the decision to re-compete the MEP centers on the basis of the need to find savings within the program to avoid making across the board cuts to all centers in the face of uncertain budgets. Dr. Jeffrey also stated that the Administration did believe ATP was an effectively run program, but that ATP's activities were an inappropriate role for the Federal Government.

Dr. Williams, testifying on behalf of the Alliance for Science and Technology Research in America (ASTRA), gave his strong support for the doubling of NIST's budget, noting that NIST's activities promoted economic growth and improvements in the quality of life for Americans without bias for particular enterprises or technologies. However, he expressed his concern that NIST researchers currently faced too many demands without the adequate funding to effectively and efficiently perform all of them. He was similarly concerned that researchers at NIST often competed for funding from other government agencies, reducing the amount of time and effort spent on purely industrial problems. Dr. Williams stressed that NIST must continue to attract and hire world-class researchers. He also testified that nanotechnology should be a key focus for NIST.

Mr. Borrus testified that ATP performed a vital function in enabling commercialization. He explained that today's capital markets are risk-adverse and tend to invest money later in technology development when the product is closer to profitability. He stressed that the National Academies reviewed ATP and concluded that program was well-run and met the goal of giving a measurable return on investment.

Mr. Peter Murray recounted his company's experience with MEP and noted that with the MEP assistance, Welch Allyn grew to add more employees, expand operations, save money by embracing lean manufacturing principles, and create a more skilled workforce. He stated that he believes MEP is unique compared to private-sector consultancy companies because MEP focuses on their clients' success and not on selling future services. Mr. Murray also stated that he believes that most MEP offices run efficiently and that a re-competition would not identify any cost savings.

Mr. Ryan also shared his company's experience with MEP, noting that MEP is a strong contributor to the Nation's economy. He expressed his concern that the Administration's proposed 56 percent budget reduction for the program would seriously impact the expertise MEP can provide and the benefits the clients can gain.

**4.6(b)—The Department of Homeland Security's R&D
Budget Priorities for Fiscal Year 2008**

March 8, 2007

Hearing Volume No. 110–8

Background

On Thursday, March 8, 2007, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation held a hearing to consider the President's fiscal year 2008 (FY 2008) budget request for the Department of Homeland Security's (DHS) research and development activities. The Members and witnesses discussed budget priorities within the Science and Technology Directorate (S&T) and the Domestic Nuclear Detection Office (DNDO).

The witnesses were: (1) The Honorable Jay M. Cohen, Under Secretary for Science and Technology at DHS; (2) Mr. Vayl Oxford, Director of the DNDO; (3) Dr. Gerald L. Epstein, senior fellow for science and security in the Homeland Security Program at the Center for Strategic and International Studies (CSIS); (4) Mr. Jonah J. Czerwinski, senior fellow with the Global Leadership Initiative at IBM, also a Senior Advisor for Homeland Security Projects at the Center for the Study of the Presidency (CSP); and (5) Ms. Marilyn Ward, Executive Director of the National Public Safety Telecommunications Council (NPSTC).

Summary of Hearing

The hearing reviewed the Administration's budget request for DHS S&T and DNDO of \$799.1 million and \$569.1 million, respectively, focusing on the following issues and concerns: the use of risk assessments by DHS to prioritize R&D funding; the appropriate balance between short- and long-term research and the criteria used to determine this balance; and the degree to which DHS R&D priorities align with the needs of their customers, including DHS agencies, other federal partners, and State and local governments. Chairman Wu opened by acknowledging the difficulties DHS has encountered in setting up R&D programs. He expressed concern over the lack of a strategic plan based on risk assessment, which he argued should be the basis for research priorities within DHS. He encouraged DHS to carry out a detailed risk assessment to ensure that Congressional funding is properly allocated. Ranking Member Phil Gingrey expressed his belief that the Nation's scientific enterprise is a critical component of national security and praised the efforts of the S&T Directorate and the DNDO. He also noted that prioritizing funding is a difficult task and that he would be interested in addressing this topic during the hearing.

Under Secretary Cohen assessed his first six months on the job, stating that he has two thirds of the staff he hopes to have in place by the end of year. He stated that the six technical divisions are on track, and that DHS S&T has established a Division of Human Factors Research to focus on the psychology of terrorism and human interactions with security technologies and systems. The Under Secretary noted that he owed Congress two planning documents: a risk informed and customer focused plan for the DHS

S&T Directorate; and a broader, government-wide strategic plan for DHS S&T's role in addressing security risks. When asked, Under Secretary Cohen testified that the BioWatch program was successful and he noted that S&T was working on BioWatch III, which incorporates digital technologies to enable real time monitoring of risks, such as anthrax and botulism. When asked about the Secure Borders Initiative and responding to the needs of Customs and Border Patrol agents in the Southwest, Under Secretary Cohen stated that he is working closely with Customs and Border Patrol to meet their needs. The Under Secretary was also asked how DHS will spread funding through the University Centers for Excellence program, which was cut significantly since FY 2006. He noted his concern for this trend and stated that he hoped the Administration would soon value the products of research and request funding accordingly.

Mr. Oxford stressed the importance of securing the Nation's ports as quickly as possible, but noted that the long-term plans for DNDO included an exploratory research program, a dedicated Academic Research Initiative, and several upcoming advanced technology demonstrations.

Dr. Epstein noted the challenge of determining the urgency of security threats and prioritizing R&D funding commensurate with that threat assessment. He also stated the importance of the potential importance of the Homeland Security Science and Technology Fellows program to Homeland Security specific problems.

Mr. Czerwinski stated that the DNDO budget included funding for long-term R&D commitments showing progress in the area of nuclear detection. He advised that special attention be paid to the methodology and makeup of the Global Nuclear Detection Architecture to better illustrate the connection between risk assessment and the DNDO's budget.

Ms. Ward highlighted some interactions between NPSTC and DHS, such as providing DHS with comments on the SAFECOM Program and examining technical and regulatory implications of radio spectrum utilization and management. She noted the importance of broadband to new and innovative technology for public safety officials and asked that the Subcommittee consider the creation of a Public Safety Broadband Trust.

4.6(c)—Small Business Innovation Research Reauthorization on the 25th Program Anniversary

April 26, 2007

Hearing Volume No. 110-23

Background

On Thursday, April 26, 2007, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation met to examine the performance of the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs on their 25th and 15th anniversaries, respectively, and to discuss any changes to the program. The SBIR program sets aside a portion of federal agency extramural research budgets for research projects at small businesses. The STTR program also sets aside a portion of

extramural funding to fund cooperative research projects between small businesses and research institutions.

The witnesses were: (1) Mr. Bruce J. Held, Director of the Force Development and Technology at the RAND Arroyo Center, RAND Corporation; (2) Mr. Jon Baron, Executive Director of the Coalition for Evidence-Based program Policy at the Council for Excellence in Government, (3) Mr. Robert N. Schmidt, Founder and Chairman of Cleveland Medical Devices and Orbital Research Inc.; (4) Dr. Gary McGarrity, Executive Vice President of Scientific and Clinical Affairs, VIRxSYS Corporation; and (5) Mr. Anthony R. Ignagni, President and CEO of Synapse Biomedical Inc.

Summary of Hearing

The hearing focused on several important issues for the future of the SBIR and STTR programs, including: the degree to which the current programs are meeting their objectives; the adequacy of the award levels; strategies to maximize small businesses participation and increase participation by women and minority owned small businesses; the programs' effectiveness in promoting product commercialization; covering administrative costs; and the appropriate role for venture capital-backed small businesses. Chairman Wu opened the hearing by discussing the benefits of the SBIR/STTR programs such as the stimulation of high-tech innovation and strengthening U.S. competitiveness. He then invited witnesses to address topics such as the size of the awards, broadening the participation of small business, creating funding within the program for administrative costs, and determining the extent of participation by venture capitalists. Both Chairman Wu and Ranking Member Gingrey emphasized the role that these programs have in moving ideas from the laboratory to the marketplace, particularly innovative work on health care issues such as diabetes and Alzheimer's research.

Mr. Held stated that the Department of Defense (DOD) SBIR program could benefit from changes that would make the program more effective in generating technology and products that are utilized by the Armed Forces. He suggested that more flexibility in the solicitation and funding process would enhance the program. He called for increases in the minimum awards for Phase I and Phase II and advised a set-aside for administrative expenses.

Mr. Baron opened with examples of SBIR successes in the computer and biomedical fields and said that the program had led to multiple scientific breakthroughs and commercial successes. He cited GAO and DOD data that suggests that the projects which fail to meet commercial success are often in firms lacking entrepreneurial capabilities, and recommended that SBIR consider methods to build up entrepreneurial skills. In response to a question by Chairman Wu regarding using a portion of funding for administrative costs, Mr. Baron as well as Mr. Schmidt and Mr. Held, cautioned that an administrative set-aside could draw funds away from program goals and create disincentives for good management.

Mr. Schmidt expressed concern that the U.S. was falling behind in the creation of technological products and jobs. He described some benefits of SBIR and STTR such as helping universities to strengthen commercialization and job creation at small high-tech

firms. He cautioned against proposals that would give SBIR funds to large companies or blur its research focus and recommended a gradual doubling of the programs.

Dr. McGarrity explained that biotechnology research takes a lot of time and a large initial expenditure. He criticized the Small Business Administration (SBA) decision to exclude some venture capital (VC) backed businesses from SBIR and stated that his firm had to abandon promising research in cystic fibrosis and laid off employees as a result of the ruling. He stated that his company is willing to compete with VC backed companies for SBIR funds on the basis of scientific and technical merit, and believes that science suffers from the exclusion of firms that have a commercialization track-record. In response to a question by Mr. Wu about the impact of the SBA ruling, Dr. McGarrity argued that the SBA rule led to ineligibility of businesses based not on the number of employees of their own business, but on the number of employees in their VC backing firms.

Mr. Ignati recommended that the minimum award for Phase I and Phase II be increased from their 1992 amounts and that the agencies administering the SBIR program be granted more flexibility making administrative decisions. He also recommended that companies be allowed to apply for Phase II grants without having first received a Phase I grant. He then expressed his concern that the SBIR program is not able to increase participation of innovative high-tech firms as a result of the SBA ruling excluding VC backed firms. He recommended that all VC backed firms be allowed to participate in SBIR.

4.6(d)—Green Transportation Infrastructure: Challenges to Access and Implementation

May 10, 2007

Hearing Volume No. 110-27

Background

On Thursday, May 10, 2007, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation held a hearing to examine options for construction technologies and materials available for transportation infrastructure that contribute to stormwater management and the control of non-point source water pollution. Federal and local government officials and industry representatives discussed these technologies and addressed barriers to their widespread implementation.

The witnesses were: (1) Ms. Gloria Shepherd, Associate Administrator for Planning, Environment, and Realty at the Federal Highway Administration (FHWA) of the U.S. Department of Transportation; (2) Mr. Benjamin Grumbles, Assistant Administrator for the Office of Water at the U.S. Environmental Protection Agency (EPA); (3) Mr. Sam Adams, Commissioner of Public Utilities for the City of Portland, Oregon; (4) Mr. Dan Huffman, Managing Director for National Resources for the National Ready Mixed Concrete Association (NRMCA); and (5) Mr. Hal Kassoff, Senior Vice President for Sustainable Development at Parsons Brinckerhoff.

Summary of Hearing

The hearing addressed three major issues: future research needs for the development, testing, and evaluation of green transportation infrastructure technologies; the need for guidelines for builders and communities for the implementation of these technologies; and the role of the Federal Government in developing and promoting these technologies. Chairman Wu stated that local governments and the private sector have been collaborating to develop green transportation infrastructure to reduce non-point source water pollution to protect ecosystems at a low cost. He added that he hoped that the hearing would address how these technologies could be integrated into the national transportation infrastructure. Ranking Member Phil Gingrey stated that roads allow for the American economy to function and for Americans to travel. He acknowledged, though, that these same roads have a significant impact on the environment. He expressed his belief that green transportation could be a positive solution for all stakeholders, but cautioned that he did not think the technologies were fully developed.

Ms. Shepherd stated that FHWA is striving to improve environmental quality while managing the Nation's highways. She mentioned that an important role for FHWA is to coordinate with the federal, State, and local levels to provide data, training, and technical assistance. She also noted that states have learned that preventing environmental degradation can save money. She testified that FHWA has taken an active role in the Green Infrastructure Planning Workshops to help address stormwater runoff management, recycling, and conservation and ecosystem management. Ms. Shepherd stated that the lack of a comprehensive cost-benefit analysis hinders the implementation of green transportation technologies on a wide scale.

Mr. Grumbles stated that the EPA works in conjunction with FHWA and other for-profit and nonprofit groups to advance green transportation as a sustainable way to improve the environment. He provided the example that the EPA Region 3, in collaboration with FHWA, is developing green transportation technologies, such as porous pavements, that simulate natural processes to treat stormwater runoff. Mr. Grumbles testified that the EPA has entered into memorandums of agreement with the National Resource Defense Council, Low Impact Development Center, and others to further green infrastructure initiatives such as rain gardens, green roofs, and permeable concrete. He also stated that the EPA was striving to reduce barriers that prevent green infrastructure from being implemented.

Commissioner Adams focused his testimony on green infrastructure success stories in the City of Portland and the barriers Portland and other cities face in implementing green transportation technology on a wider basis. He told the Subcommittee that the City of Portland built infrastructure to mimic natural cycles to reduce discharges into the Willamette River and to avoid treating the runoff at a wastewater treatment plant. These methods saved money and brought environmental gains. Commissioner Adams emphasized that the EPA has not aligned the needed regulations and guidelines for green transportation projects, thus preventing

other cities from implementing similar projects due to a high amount of uncertainty and risk.

Mr. Huffman testified that pervious concrete has been in use for over twenty-five years and is now considered a Best Management Practice (BMP) by the EPA. He explained that this concrete has no sand, allowing for air voids to comprise 15 to 30 percent of the concrete. Mr. Huffman stated that this technology can be used to recharge groundwater, to prevent aquifer depletion, and to provide water to the roots of nearby plants, and that the concrete can last 20 to 30 years. He testified that the NRMCA is developing guidelines for pervious concrete and helping to create a program for pervious concrete certification.

Mr. Kassoff testified that highways that meet transportation goals while preserving the environment are a feasible goal for transportation officials. He stated that citizens demand these types of projects and that sustainable highways can save money over the long-term. He noted that 90 percent of highway improvements today are made on existing infrastructure, allowing communities to improve their highways while sparing the development of new land. Mr. Kassoff also stated that there were multiple barriers to sustainable highways, including motor vehicles that leave a carbon footprint, particularly air pollution, and land use choices that lead to urban sprawl.

4.6(e)—SBIR and STTR—How Are the Programs Managed Today?

June 26, 2007

Hearing Volume No. 110-43

Background

On Tuesday, June 26, 2007, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation held a hearing to review the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs. This was the second of two hearings on the SBIR program reauthorization, the purpose of this was to examine trends in agency programs since the last reauthorization of SBIR and STTR and agency enhancements to meet statutory program goals and support agency missions.

There were five witnesses: (1) Mr. Michael J. Caccuitto, SBIR/STTR Program Coordinator, Office of Small Business Programs, Department of Defense; (2) Ms. Jo Anne Goodnight, SBIR/STTR Program Coordinator, Office of Extramural Research of National Institutes of Health, Department of Health and Human Services; (3) Mr. Larry S. James, SBIR and STTR Program Manager and Acting Director, Small Business Research Division, Department of Energy; (4) Mr. Doug A. Comstock, Director, Innovative Partnership Program Office, National Aeronautics and Space Administration; and (5) Dr. Kesh S. Narayanan, Director, Division of Industrial Innovation and Partnerships in the Directorate for Engineering, National Science Foundation.

Summary of Hearing

The hearing focused on the following issues: program trends; outreach to encourage new applicants and reaching out to a diverse pool of applicants; program data and tracking; and the role of procurement in enabling commercialization. Chairman Wu opened the hearing by discussing the large growth of the SBIR and STTR programs, which are now the largest Government programs supporting research and development at small companies. He emphasized the programs' duties to promote efficiency in operations and maximum public benefit. In Ranking Member Phil Gingrey's opening statement, he explained that every department and agency with an R&D budget exceeding \$100 million must provide 2.5 percent of this budget for research at small companies, resulting in more than \$2 billion in funds across the agencies. The goal of these programs, he said, is to stimulate competitiveness and innovation. He was optimistic about past achievements of the programs and the prospect of future success.

Mr. Caccuitto said that the SBIR and STTR programs at the Department of Defense are crucial in seeding innovation for defense technologies. Each "constituent" military department and defense agency has its own program, with centralized oversight and decentralized management, with the total DOD SBIR/STTR budget across all military departments at over \$1.26 billion. DOD funds about one in seven SBIR Phase I proposals and one in five STTR proposals.

Ms. Goodnight emphasized that program flexibility is the key to fulfilling SBIR and STTR goals at NIH. She noted that the programs have not grown at the rate of other NIH programs due to firms losing eligibility, going out of business, or perceived lack of participation incentives. She discussed NIH's development of PODS for data tracking that help to monitor achievements of awardees. In response to a question by Ranking Member Gingrey about the effect of the 2003 SBA ruling on venture capital backed companies' participation in the program, Ms. Goodnight stated that the nature of biotechnology research requires venture capital to fund expensive trials. She described some cases where important research was halted as a result of the ruling.

Mr. James said that, like at the DOD, the Department of Energy has a balance of centralized and decentralized management for their SBIR and STTR programs. He explained that the Department hosts State-sponsored events to reach out to small businesses. These small businesses have excellent science skills but lack business skills; thus, DOE provides these professionals with assistance in designing business plans. He stated that in the past 24 years the DOE has invested almost \$1.5 billion, 60 percent of the companies have had sales of more than \$1.6 billion.

Mr. Comstock noted that the SBIR and STTR programs were recently moved from NASA's four mission directorates to an agency-wide mission support office that reports to the Administrator's Office in response to the Innovative Partnerships Program of 2005. This more integrated approach helps to illuminate technology gaps and future technologies which will be infused into NASA, helping to reach mission goals. He cited phase three authority to enter into sole source contracts as a benefit for NASA's programs. He stressed

that NASA's outreach efforts have been successful in providing a fresh applicant pool. In response to a question by Chairman Wu on whether the agencies have adequate funding for administration, Mr. Comstock, as well as Mr. James and Ms. Goodnight, stated that administrative funding is not adequate to allow the optimal level of commercialization assistance.

Mr. Narayanan stated that SBIR plays a critical role in moving discovery to innovation at NSF. He explained that in addition to the SBIR/STTR grants, NSF has pioneered a Phase II supplement for funding, providing greater incentive for third-parties to invest in the awardees' projects. He stated that follow up of 400 NSF SBIR grantees has shown a significant impact; however, limited funds prevent program managers from providing hands-on mentoring.

4.6(f)—The Bayh-Dole Act (P.L. 96-517, Amendments to the Patent and Trademark Act of 1980)—The Next 25 Years

July 17, 2007

Hearing Volume No. 110-46

Background

On Tuesday, July 17, 2007, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation met to investigate the private and academic sectors' perspectives on the current implementation of the Bayh-Dole Act, and to provide recommendations on improving implementation over the next twenty-five years. It also covered the impact of the Act on industry-academic relations and the effects of globalization on the current statutory scheme.

The witnesses were: (1) Mr. Arundee S. Pradhan, Director of Technology and Research Collaborations, Oregon Health & Science University; (2) Dr. Susan B. Butts, Senior Director, External Science and Technology Programs, Dow Chemical Company; (3) Mr. Wayne C. Johnson, Vice President, Worldwide University Relations, Hewlett-Packard Company; (4) Dr. Mark A. Lemley, Professor of Law, Stanford Law School, and Director, Stanford Program in Law, Science and Technology; and (5) Dr. Mark G. Allen, Professor, School of Electrical and Computing Engineering, Georgia Institute of Technology and Co-Founder and Chief Technology Officer, CardioMEMS, Inc.

Summary of Hearing

The hearing focused on several issues, including the impact of the Bayh-Dole legislation on commercializing federally funded research and shaping university-industry relations, and the influence of Bayh-Dole on basic university research. Chairman Wu began by describing the significance of the passage of the Act at a time of declining competitiveness and the importance of promoting university-based research and subsequent technology transfer to industry. He asked witnesses to discuss the impact of the Act on technology transfer, differences in interpretations of the Act, increases in collaboration with foreign companies or universities due, and changes in the academic research process due to the Act. He asked wit-

nesses also to discuss whether the Act had created any barriers to innovation. Ranking Member Phil Gingrey stated that he believed that the Act had been the most successful technology-transfer program ever implemented, but he was concerned that private parties were having more difficulty in reaching agreements with universities. He hoped that a solution could be found to preserve American competitiveness.

Mr. Pradhan praised the Act for stimulating the economy and creating new technologies and products. He described other benefits derived from Bayh-Dole including State-funded initiatives that leverage federal funding and the fostering of university-industry partnerships. Mr. Pradhan stated that Bayh-Dole provides a simple structure that works as intended and cautioned against substantially altering the legislation. He advocated a review of the Act to strengthen it and provide more effective oversight. In response to Ranking Member Gingrey's question on the benefits received by the public from taxpayer-funded patents, Mr. Pradhan and Mr. Johnson both pointed to the reinvestment in further research and the creation of jobs and tax revenue.

Dr. Butts noted that the *Bayh-Dole Act* has created intellectual property (IP) precedents that discourage industry-academic collaboration and encourages industry collaborations with foreign universities that provide greater IP rights. She argued that while Bayh-Dole is fundamentally sound, the varied implementation strategies by universities can lead to questionable IP practices, such as staking IP claims from privately funded research. In response to Mr. Wu's question regarding the university approach to patenting, Dr. Butts suggested more coordination between the issuance of intellectual property licenses and the creation of sponsored research agreements.

Mr. Johnson explained that most products contain dozens of patents that give value by working in concert; no one patent is more important. He recommended that the Act be left untouched, but that innovation be encouraged as a separate process from invention. He commented on the difficulties of working with American universities as a result of Bayh-Dole, noting that the emphasis placed on IP and the relative ease of working overseas could harm domestic research endeavors.

Dr. Lemley described the increase in university patents because of the Act. He contended that this encouraged universities to commercialize their research, but it also removed the incentive to engage in more long-term research. He claimed that the solution to this problem was with the universities, not in the Act. Different situations require different forms of intellectual property protection.

Dr. Allen stressed the importance of clear intellectual property rights and flexible licensing rules. He explained that a particular innovation can be applied to create numerous new products if there exists a clear beneficiary from the effort and a flexible system within which innovators can operate.

4.6(g)—The United States Fire Administration Reauthorization: Addressing the Priorities of the Nation's Fire Service

October 2, 2007

Hearing Volume No. 110–59

Background

On Tuesday, October 2, 2007, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation met to discuss the fire service community's priorities for the U.S. Fire Administration (USFA). Members and witnesses discussed USFA's current activities, challenges facing the Nation's fire service, and the fire service community's priorities for USFA's reauthorization. The hearing also examined the agency's role in the Department of Homeland Security's overall disaster and response mission.

The witnesses were: (1) Chief Gregory B. Cade, the U.S. Fire Administrator, Director of USFA; (2) Dr. Sivaraj Shyam Sunder, Director of the Building and Fire Research Laboratory (BRFL) at the National Institute of Standards and Technology (NIST); (3) Chief Steven P. Westermann, President and Chief Fire Officer, International Association of Fire Chiefs (IAFC); (4) Captain Robert Livingston, Captain in the Salem, Oregon Fire Department and representative to the Oregon State Council of Firefighters of the International Association of Firefighters (IAFF); (5) Chief Gordon Henderson, Deputy Chief of Operations, Rome-Floyd County Fire Department, Georgia, Past President of the Georgia State Firefighters' Association of the National Volunteer Fire Council (NVFC); and (6) Dr. John R. Hall, Assistant Vice President, Fire Analysis and Research, National Fire Protection Association (NFPA).

Summary of Hearing

The hearing focused on several important topics, including: the current status of core USFA activities (National Fire Academy training, educational programs, and fire data collection); the major priorities of the fire service for the USFA reauthorization; the status and budget of USFA's research activities; bringing the needs and expertise of the fire service to the Department of Homeland Security (DHS); and USFA's support of State and local fire service agencies. Chairman Wu opened the hearing by stating that while U.S. fire safety has improved markedly since 1973 when USFA was created, too many citizens and first responders still die or suffer injuries in fires every year. Additionally, the U.S. suffers a far higher fire casualty rate than do European countries and other industrialized nations. He recognized USFA's crucial education, training, policy development activities, and safety standards efforts, as well as their research and standards efforts. He stated that he was very interested in hearing the fire service community's priorities for reauthorization. Ranking Member Phil Gingrey stated that the USFA activities over the last 30 years have helped reduce fire-related deaths by approximately 25 percent. He also noted that fires cause considerable economic impact each year, a trend that is going up-

ward. Lastly, he noted that USFA and the fire service community needed to carefully consider its goals for updating the National Fire Incident Reporting System.

Administrator Cade stressed the importance of training local first responders and developing their expertise. He argued that the fire service should continue to take the lead on educating emergency responder on incident command that meets the standards of the National Incident Management System. He also noted that the USFA has been working with the U.S. Forest Service and the Bureau of Land Management to design training for structural firefighters to fight fire in the wildland urban interface (WUI). He advocated for updating NFIRS, noting that it currently can take twelve to eighteen months for data to reach the system. Administrator Cade also stated that USFA would continue to take a leadership role in working to reduce the number of firefighter line-of-duty deaths.

Dr. Sunder described NIST's research on fire and fire safety, which included: determining the fire-resistant properties of modern furnishings, building materials, and designs; performance measures and tools to develop new firefighting technologies; and science-based approaches for limiting the growth and spread of fire. He stated that NIST was also working on mitigating the risk of fires spreading to developed areas in the WUI. Dr. Sunder said that NIST's Fire Research Grant Program has been the primary federal source for fire research at universities for the past 30 years, and that NIST works with USFA to develop fire-related research priorities. Currently, a NIST employee spends one day a week at the USFA headquarters in Emmitsburg, Maryland.

Chief Westermann stated that USFA plays a major role in preparing the fire service for an all-hazards mission, citing the over 84,000 emergency response personnel who have received training either at the National Fire Academy or through off-campus and distance learning programs. He urged Congress to fund USFA at its authorized levels and reiterated the importance of updating NFRIS. He urged the Committee to consider establishing a position at the National Operations Center for the fire service. Chief Westermann commended USFA's work and leadership on pressing issues like the WUI and educating the public about fire sprinklers.

Captain Livingston emphasized that the fire service is now providing more emergency response services, elevating the importance of training for Hazmat and WMD response, as well as emergency medical services. He expressed confidence that USFA understood the evolving role of the fire service but worried that this was not well appreciated beyond USFA in the Federal Government. Therefore, he advocated for USFA to bolster its efforts to educate DHS and other federal agencies about the fire service. He stated that national voluntary consensus standards could help reduce line-of-duty deaths. Captain Livingston urged an authorization that met the needs of a modern fire service.

Chief Henderson noted that NVFC represents over one million volunteer firefighters and emergency medical personnel. He explained that the most beneficial activity of USFA for volunteer firefighters is their Volunteer Incentive Program, which consolidates training courses for those unable to take time-off for the longer

training sessions. He was pleased to see that the draft reauthorization authorized USFA to engage in activities in the WUI, Hazmat, and EMS. Chief Henderson also stressed the importance of NFIRS.

Dr. Hall stated that USFA funded important research projects and also that the agency has been an important collaborator on a number of NFPA research projects. He explained NFPA's role as a primary source for codes and standards for fire safety and the fire service, and he testified that the standards making process benefited from USFA and NIST expertise. He stated that in 2006, USFA partnered with NFPA to perform the Second Fire Service Needs Assessment, which he hoped would guide policy-makers. Dr. Hall also stated that NFIRS was critically important to policy-makers in defining the national fire problem; thus, he cautioned that any update to gather a greater quantity of data more quickly should make sure that the sampling is still reliable and useful for analysis.

***4.6(h)—The Globalization of R&D and Innovation,
Part III: How Do Companies Choose Where to Build
R&D Facilities?***

October 4, 2007

Hearing Volume No. 110-62

Background

On Thursday, October 4, 2007, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation held a hearing to consider the factors companies use to locate their research & development (R&D) and science, technology, and engineering intensive facilities. This hearing—the third in a series of hearings examining the impact of globalization on innovation—explored the trends in, and factors for site selections for science, technology, and engineering intensive facilities and the policies needed to ensure that the U.S. remains attractive for these investments.

The witnesses were: (1) Dr. Martin Kenney, Professor of Human and Community Development at the University of California, Davis, and Senior Project Director at the Berkeley Roundtable on the International Economy, University of California, Berkeley; (2) Dr. Robert D. Atkinson, President of the Information Technology and Innovation Foundation (ITIF); (3) Mr. Steve Morris, executive director of the Open Technology Business Center (OTBC); (4) Mr. Mark M. Sweeney, Senior Principal in McCallum Sweeney Consulting, a site selection consulting firm; and (5) Dr. Jerry Thursby, Ernest Scheller, Jr. Chair in Innovation, Entrepreneurship, and Commercialization at Georgia Institute of Technology.

Summary of Hearing

The hearing covered several important areas, including: the trends in site selection for R&D facilities; factors considered when citing R&D facilities; and strategies local governments can employ to increase their attractiveness to companies looking to locate R&D facilities. Chairman Wu explained in his opening statement that in order to understand the R&D challenges in the United States, the country must understand who it is competing against for attracting

facilities. He stated that the purpose of this hearing was to uncover how companies determine where to locate their R&D facilities, and to discuss ways to encourage them to locate these facilities in the U.S. Ranking Member Phil Gingrey stated that despite the U.S.'s leadership in R&D, companies are continuously emerging overseas. He noted that many of these countries are modeling their economic activities after the U.S. and investing in human capital. He argued that in order for the U.S. to preserve its leadership roll in innovation and technology, the Nation must improve STEM education, facilitate domestic investment in R&D, and collaborate on R&D policy.

Mr. Kenney testified that R&D offshoring in high labor cost nations is not new, but the rapid expansion of these facilities in China and India is a recent phenomenon. He stated his view that this is due to product localization, government pressure, and proximity to key customers, as well as cost considerations. The growth of the Indian and Chinese R&D workforce is also a driving factor to R&D firms. He was optimistic, however, that the conceptualization of products will continue to remain in the U.S. He explained that many foreign nations have tax and other incentives to encourage R&D firms to locate there. He suggested that in order for the U.S. to continue to strengthen its R&D position, it must address the issue of the cost of graduate education, consider creating a National Institute of Information Sciences, and reestablish a balance between patent protection and increasing a stock of usable knowledge.

Dr. Atkinson noted that over 60 percent of U.S. companies are investing R&D in China, 50 percent in India, and 20 percent in Eastern Europe, with outsourcing increasing at rates higher than in-sourcing. He argued that cost is the primary motivation for these moves, with access to market and talent being important, but secondary. He advised that the U.S. increase its R&D tax credit, encourage students to be well-trained in the sciences, grant visas for those with strong R&D skills, and renegotiate foreign trade policy to discourage unfair foreign practices, such as requiring the establishment of facilities to gain market access.

Mr. Morris argued that the U.S. cannot lead in every possible area of R&D, stressing that it was important for the country to prioritize its investments based on its strengths. He emphasized improving the K-12 education system. He also said that the U.S. has an "entrepreneurial flair" and can build on it by providing incentives to raise "seed level money" for entrepreneurial endeavors.

Mr. Sweeney said that in his experiences with assisting companies in choosing site locations the determining factors proved to be different from project to project. He said companies examine physical factors, such as sites, buildings, and infrastructure; operating factors, which influence the decision and location over the project life; and living factors, such as medical availability, housing markets, and community. He testified that incentives are generally not a strong motivation until the end of evaluation, after considering all of the prior factors. He said a big project, like the space program, could excite the public and encourage R&D in the U.S., and he also emphasized that lowering costs is crucial for attracting R&D investment in the U.S.

Dr. Thursby reported on a survey of U.S. and Western Europe R&D intensive firms, stating that 62 percent of respondents said they did not anticipate a change in distribution of R&D investments in the next three years but that some responded that decreases would be more likely in U.S. and Western Europe, while increases would take place in India and China. He stated that growth potential within countries and output markets are an important consideration in determining where to locate, followed by the quality of R&D personnel. However, on average, most respondents said tax brackets and regulatory restrictions were not a major consideration. Universities, Dr. Thursby noted, were extremely important in determining where R&D is located. He also noted that in China R&D often follows manufacturing, but that he did not see the same trend in India.

***4.6(i)—The Globalization of R&D and Innovation,
Part IV: Implications for the Science and Engineering
Workforce***

November 6, 2007

Hearing Volume No. 110-71

Background

On Tuesday, November 6, 2007, the Honorable David Wu presiding, the Subcommittee on Technology & Innovation held a hearing to consider the implications of the globalization of R&D and innovation for the American science, technology, engineering and mathematics (STEM) workforce. This hearing—the fourth in a series of hearings examining the impact of globalization on innovation—explored the impact of high-technology offshoring on American STEM workers and students. Witnesses discussed the new opportunities and challenges for workers created by globalization, how offshoring is affecting the STEM workforce pipeline, and how incumbent workers are responding to globalization.

The witnesses were: (1) Dr. Michael S. Teitelbaum, Vice President of the Alfred P. Sloan Foundation; (2) Dr. Harold Salzman, senior research associate at the Urban Institute and author of a recent study on the STEM workforce pipeline and offshoring; (3) Dr. Charles McMillion, President and chief economist at MBG Information Services; (4) Mr. Paul J. Kostek, Vice President for career activities of the IEEE–USA; and (5) Mr. Henry Becker, President of Qimonda North America.

Summary of Hearing

The hearing addressed several key issues including: how the globalization of R&D will affect the supply and demand of STEM workers in America; the types of jobs that will face increased competition from low-cost labor force countries; and whether a lack of supply of skilled workers in the U.S. forces companies to locate high-tech jobs elsewhere. Chairman Wu stated that careers in science and engineering have a more uncertain future than in previous decades, creating job insecurity for many STEM workers. He said it was crucial to understand which jobs were subject to offshoring so that individuals and policy-makers could make in-

formed decisions. Learning more about the skills employers expected from science and engineering workers could help students prepare for the workforce of tomorrow. Ranking Member Phil Gingrey noted that the U.S. has created a strong tradition of innovation in part by attracting and retaining some of the best minds in the world and that globalization, driving science, and engineering jobs overseas threatens this advantage. He said that scientists and engineers are growing concerned with their future career prospects, even though science and technology continues to move the economy. He urged new policies that would encourage foreign companies to move technology jobs to the U.S.

Dr. Teitelbaum testified that there was uncertainty about the numbers of jobs being offshored, making the future of R&D offshoring difficult to predict. He also said that there was not yet enough evidence to conclude that there was a shortage of scientists and engineers in the U.S. He reported that a large number of college freshmen were interested in science and engineering careers, but half changed their minds before graduation. Dr. Teitelbaum also stated that increased funding meant more doctoral and post-doctoral research opportunities, but not necessarily more permanent jobs. He suggested that a well-designed series of incentives would better match up students and careers.

Dr. Salzman explained that globalization was not simply driven by cost considerations, but was also an overall strategy by research intensive firms working to establish themselves in growing markets and provide a broader array of products. He also testified that the results of his analysis showed that the offshoring of STEM jobs was not driven by a lack of a skilled STEM workforce in the U.S. Dr. Salzman emphasized that as firms globalize, more jobs would be subject to offshoring, especially as firms decompose and commoditize these jobs. Because of the new forces driving the global economy, he cautioned that it was incorrect to assume the U.S. could hold any particular job type indefinitely, and thus efforts to produce more scientists and engineers in traditional disciplines may be misdirected.

Dr. McMillion noted that the demand for science and engineering jobs was fueled in part by an economy structured around debt and global trade, two areas where the U.S. is no longer at an advantage. He explained that as manufacturing and trades moved abroad, the research and development system creating many science and technology jobs deteriorated. At the same time, he noted, competing countries were modernizing their research and development systems. When asked about technology transfer, Dr. McMillion explained that there are some laws available to protect American companies from being forced to make excessive technology transfers in its overseas deals, but that more laws protecting these companies would give them a better bargaining position.

Mr. Kostek stated that the engineering profession internally felt as though the challenges of globalization were greater than previous economic downturns. He argued that rather than focusing solely on increasing the number of students entering the field, more attention should be paid to retraining displaced engineers and utilizing their experience towards more competitive endeavors.

He noted that if the retirement age goes up, there would be a large pool of engineers to draw from with substantial job experience but not necessarily jobs for those people.

Mr. Becker claimed that the U.S. was not creating enough skilled workers to support industries like the production of semiconductors and other high-end technological components. He argued that companies in countries that pursued research and development as a strategic interest had a competitive advantage and that the U.S. should emphasize attracting the most talented students for science and technology-related careers.

***4.6(j)—Next Generation Border and Maritime
Security Technologies: H.R. 3916***

November 15, 2007

Hearing Volume No. 110-73

Background

On Thursday, November 15, 2007, the Honorable Bart Gordon Presiding, the Subcommittee on Technology and Innovation held a hearing to discuss H.R. 3916. H.R. 3916 would authorize specific border security technology programs, and instruct the Department of Homeland Security Science and Technology (DHS S&T) Directorate to improve processes for setting research priorities and securing the needs of technology end-users.

The witnesses were: (1) Dr. Robert Hooks, Director of Transition for the Department of Homeland Security's Science and Technology Directorate; (2) Mr. Ervin Kapos, Director of Operations Analysis for the Department of Homeland Security's Science and Technology Directorate and Executive Director of the Homeland Security Science and Technology Advisory Committee (HSSTAC); (3) Dr. Brian Jackson, Associate Director of the Homeland Security Research Program at the RAND Corporation.; and (4) Chief Jeff Self, Division Chief of the U.S. Border Patrol.

Summary of Hearing

Chairman Bart Gordon opened the hearing by listing some of the threats that cross the Nation's border every day. He stressed the difficulty of the jobs performed by Customs and Border Patrol agents and mentioned the role of technology in providing eyes and ears for agents. He expressed concern that the research DHS S&T is currently performing lacks a long-term plan, and short-term priorities are not always responsive to the needs of end-users. However, he was optimistic that H.R. 3916 would begin to address some of these issues. Ranking Member Phil Gingrey offered support for H.R. 3916, and said that he felt that new border security technologies would be an integral part of an overall effort to secure the Nation's borders and discourage illegal immigration. Ranking Member Ralph Hall noted that terrorists adapt to new security measures, and constantly seek new methods to penetrate American borders. He said that H.R. 3916 would focus the Nation's border security research, protecting the Nation against unanticipated threats.

Dr. Hooks focused on some of the DHS S&T Directorate's successes in the area of border security technology R&D. He explained that the Directorate was recently reorganized to prioritize capability gaps and is pursuing more advanced border security technologies via a variety of project initiatives. He also stated that new research proposals attempt to account for training and implementation costs, allowing policy-makers to make more informed decisions on which technologies to implement. Dr. Hooks testified that the Division was also partnering with the Department of Defense to develop new technologies, and he spoke about specific technologies being developed to identify tunnels and the need for continued research in this area. He also mentioned the budget oversight process designed to ensure that research funding was being allocated to the top priorities.

Mr. Kapos discussed the Homeland Security Science and Technology Advisory Committee (HSSTAC) and its role in advising the Department of Homeland Security on R&D priorities. Currently, the Committee's resources are tasked with the study of improvised explosive devices (IEDs) as a threat within the United States, a change from the Committee's former structure which made recommendations for priorities across disciplines. In response to Chairman David Wu's concern that the HSSTAC was not fulfilling its mission of establishing long-term research priorities for DHS S&T, and that it was narrowly focused on counter-measures for IEDs, Mr. Kapos explained that the HSSTAC was configured to handle one problem at a time. He confirmed that the directive to study IEDs in the domestic context came directly from senior management at the Department of Homeland Security.

Dr. Jackson explained that terrorists will alter the practices, techniques, and technologies they use when confronted with a new security procedure, significantly degrading the protective value of new methods. He noted that often cheap, jury-rigged solutions can evade expensive and complicated technology which was not designed to be flexible. Dr. Jackson advised devoting more effort to testing new security technology and creating a diverse research portfolio to avoid excessive reliance on one technology.

Chief Self outlined the mission and goals of the U.S. Border Patrol. He noted that the needs of the Border Patrol include constant surveillance with quick response capabilities. The U.S. border encompasses a variety of different environments and geographic regions, each with its own unique challenges. Self emphasized the need for technologies that would work in the three major environments the Border Patrol deals with: urban, rural, and remote. He advocated continued testing and adoption of monitoring technologies to ease the burden on the Border Patrol's already challenging duties.

**4.6(k)—The Department of Homeland Security's R&D
Budget Priorities for Fiscal Year 2009**

March 6, 2008

Hearing Volume No. 110–81

Background

On Thursday, March 6, 2008, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation held a hearing to review the spending priorities in the President's fiscal year 2009 (FY 2009) budget request for research, development, testing, and evaluation (RDT&E) at the Department of Homeland Security (DHS). Agency witnesses discussed budget priorities within the Science and Technology (S&T) Directorate and the Domestic Nuclear Detection Office (DNDO), and how the Department's RDT&E efforts are developing technologies to promote the DHS mission.

The witnesses were: (1) The Honorable Jay M. Cohen, Under Secretary for Science and Technology at the Department of Homeland Security; (2) Mr. Vayl Oxford, Director of the DNDO; and (3) Mr. George Ryan, the Director for the Testing, Evaluation, and Standards Division of DHS S&T.

Summary of Hearing

Members focused on three main concerns at the hearing: whether the DHS R&D priorities reflect the needs of their stakeholders at all levels of government; how DHS uses testing and evaluation to effectively develop and deploy technology; and the balance between short-term and basic research. Chairman Wu expressed concern that the budget priorities were developed without the guidance of a comprehensive risk framework, and that DHS S&T and DNDO failed to seek adequate input from State and local technology users, or involve them heavily in product development and testing. However, he praised the DHS S&T Directorate for increasing the funding for basic, long-term research to 20 percent. Ranking Member Phil Gingrey stated that to increase security against an adaptive enemy, defenses and R&D should be broad to minimize the possibility that they can be easily sidestepped. He also expressed concern that the DHS R&D agencies did not adequately engage in RDT&E activities, but he was encouraged that they appeared to be addressing this deficiency.

Under Secretary Cohen highlighted improvements DHS S&T has made since it was created. Under his leadership: the structure of the agency was reorganized into disciplines that enabled basic and applied research, as well as product transition; staffing reached 93 percent of its Full Time Equivalent positions; and the process for allocating funds and soliciting input from the user community had improved. He also identified the Integrated Product Teams and the Technology Oversight Group as funding prioritization mechanisms, as well as recently sought assistance from the National Academies on risk-based planning and decision-making. Under Secretary Cohen, however, recognized that DHS S&T needed to improve outreach to State and local emergency responders.

Mr. Oxford testified on the fruitful partnerships between DNDO and the National Laboratories and DNDO's Academic Research Initiative that sponsors university research in the nuclear and radiological sciences. He pointed out that these efforts focus the research community on the highest radiological threats and that they are a mechanism to reverse the decline in student interest in nuclear-related fields. The DNDO research agenda is shaped by gaps identified in the Global Nuclear Detection and Reporting Architecture. Ranking Member Gingrey questioned Mr. Oxford on the increase in funding for the acquisition of advanced spectroscopic portal monitors, while funding for R&D to counter a mobile adversary likely to avoid current detection measures was flat. In response, Mr. Oxford stated that the increase in funding was needed to address weaknesses in the current system, but that R&D funding was supporting the development of other technology.

Mr. Ryan testified that the DHS S&T Testing, Evaluation, and Standards (TE&S) Division was working with the Under Secretary for Management and other DHS components to create a tests and evaluation master plan (TEMP) to be used by DHS agencies as part of their acquisition process for new technology. The TEMP is an integrated and agreed-upon plan to ensure that products will reliably meet user requirements. He also testified that the TE&S Division is developing an accredited and recognized testing capability with the goal of testing all products in an accredited and recognized facility.

4.6(l)—NIST's FY 2009 Budget Request: What Are the Right Technology Investments to Promote U.S. Innovation and Competitiveness?

March 11, 2008

Hearing Volume No. 110-83

Background

On Tuesday, March 11, 2008, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation held a hearing to consider the President's fiscal year 2009 (FY 2009) budget request for the National Institute of Standards and Technology (NIST). An Administration witness reviewed the proposed budget and technology experts provided comments and analysis.

The witnesses were: (1) Dr. James Turner, Acting Director, National Institute of Standards and Technology (NIST); (2) Dr. James Serum, Chairman, NIST Visiting Committee on Advanced Technology (VCAT); (3) Dr. Mary Good, Founding Dean, George W. Donaghey College of Engineering and Information Technology, University of Arkansas, Little Rock; (4) Dr. Peter Fiske, Vice President for Research and Development, PAX Scientific, Inc.; and (5) Mr. Michael Coast, President, Michigan Technology Center, Chairman of the Board, American Small Manufacturers Coalition.

Summary of Hearing

The hearing covered the details of the Administration's \$638 million budget request for NIST and focused on several broad issues, including: NIST's 3-year Programmatic Planning document; wheth-

er NIST's FY 2009 budget proposal aligns with the goal of increasing U.S. competitiveness; NIST's engagement with stakeholders in developing the FY 2009 budget priorities; the impact of the proposed cut of the Manufacturing Extension Program (MEP) budget; and the impact on U.S. competitiveness of eliminating programs like the Technology Innovation Program (TIP). Chairman Wu opened the hearing by praising the America COMPETES Act, which included the first comprehensive authorization of NIST in 15 years, but he expressed concern that NIST's three-year strategic plan required by that authorization fell far short of the comprehensive and detailed planning document Congress had requested. He also noted that NIST was the only science agency included in the COMPETES Act to request funding for FY 2009 that was below the level of the previous year's request. He was disappointed to see that the Administration was again proposing to eliminate MEP and TIP. Ranking Member Phil Gingrey praised the Administration's FY 2009 budget request for the NIST laboratories, but he was also critical of the decision to cut funding for MEP.

Dr. Turner thanked the Science and Technology Committee for its leadership in the COMPETES Act. He also thanked the VCAT for their most recent recommendation for NIST to implement an internal Nanotechnology Council to coordinate the agency's investments in nanotechnology research. He stated that the \$638 million budget included \$4 million for MEP, and the budget request for NIST's core programs was an increase of 22 percent over the FY 2008 appropriations. He acknowledged that MEP was a well-run program, but stated that it was not as high a priority as the other activities included in the budget. The focus of the budget, he claimed, was on high-impact technology research and well-targeted standards and measurement problems. He discussed several of the budget's research initiatives, including biometrics, disaster-resilient structures, and quantum computing.

Dr. Serum provided the VCAT's perspective on NIST's current and future strategic investments, its three-year programmatic plan, and the effectiveness of multi-disciplinary research at NIST. He praised NIST's research efforts and their world-class measurement capabilities and he stated that the VCAT supports many of the new initiatives NIST proposed in the budget request. However, regarding NIST's efforts in nanomaterial environmental, health, and safety research, Dr. Serum stated that the VCAT cautioned the agency to partner appropriately with toxicology experts, rather than try to develop in-house capabilities in this area. Dr. Serum also stated that NIST had improved its planning process and that he believed the three-year programmatic document reflected the goals of the organization, its core competencies, current research priorities, and an identification of future measurement needs.

Dr. Good testified that NIST is an important organization that performs high quality work. She noted that without NIST, the country would be at a serious economic disadvantage. Dr. Good was also disappointed about the lack of funding for MEP in the President's budget request. She argued that MEP not only provided a way for NIST to assist small businesses, but that MEP and TIP also provided conduits for NIST to learn about measurement and technology challenges in new fields like biotechnology. Dr. Good

agreed that NIST's three-year programmatic planning document did not adequately address the agencies planned activities over the next three or four years, and asserted that the plan should also have mentioned the Malcolm-Baldrige Quality Award.

Dr. Fiske discussed his experiences as a recipient of funding from the Advanced Technology Program (now TIP) and an owner of a high-tech start-up business. He stressed that venture capital is generally not available to fund early-stage development of new technology, as investors regard these investments as too risky. He argued that TIP is uniquely important among federal sources for R&D funding because the focus is solely on those technologies that will create a large economic impact and that it funds technology in its earliest stages of commercialization. Dr. Fiske also stated that TIP was efficiently run, which is essential for the fast-paced world of technology development.

Mr. Coast highlighted MEP's success, citing that MEP clients credit the program with helping them realize a collective yearly savings of more than \$1.1 billion, and helping these small- and mid-sized manufacturers to add or retain \$6.8 billion in sales and 52,000 jobs. He argued that MEP's services were crucial in a global economy where small- and mid-sized American manufactures needed to maintain a 20 percent reduction in costs with 20 percent top-line growth to remain competitive. He praised the efforts of the COMPETES Act to expand MEP centers and argued that the President's FY 2009 budget request would effectively eliminate MEP.

***4.6(m)—Aviation Security Research and Development
at the Department of Homeland Security***

April 24, 2008

Hearing Volume No. 110-97

Background

On Thursday, April 24, 2008, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation held a hearing to review the aviation security-related research, development, testing, and evaluation (RDT&E) activities of the Department of Homeland Security (DHS). The witnesses discussed how the Transportation Security Laboratory (TSL) and other DHS components support the needs of the Transportation Security Administration (TSA), the aviation industry, and the traveling public.

The witnesses were: (1) Dr. Susan Hallowell, Director of the TSL; (2) Mr. Adam Tsao, Chief of Staff, Office of Operational Process and Technology Directorate of TSA; (3) Dr. Jimmie Oxley, Professor of Chemistry, University of Rhode Island, and Co-Director of the DHS Center of Excellence for Explosives Detections, Mitigation, and Response; and (4) Dr. Colin Drury, Chair of the Department of Industrial Engineering, University of Buffalo.

Summary of Hearing

The hearing focused on three main issues: the adequacy and flexibility of the TSL R&D portfolio to meet current TSA needs and to adapt to future threats; the reliability of evaluation standards at TSL to meet the operational needs of TSA; and the consideration

of human factor engineering and human-technology interface in the development of new technology at TSL. Chairman Wu began by noting that GAO had recommended improving security technologies after a recent study showed airport security gaps. He stated the important contributions of TSL in developing these technologies, but also stressed that technology must be compatible with the human users to successfully meet security needs. Ranking Member Phil Gingrey stated that he was interested to hear how the Nation's substantial investment in transportation security R&D was coordinated through the government, and how it included appropriate university research and private sector companies.

Dr. Hallowell provided a brief history of TSL, and stated that TSL now performs R&D at the request of the DHS Science and Technology (S&T) Directorate and on an as-required basis for TSA. TSL also engages in testing and evaluation activities in three general categories: certification, qualification, and laboratory assessment testing.

Mr. Tsao testified that TSA has a strong and close relationship with DHS S&T and TSL, and that TSA relies on them heavily for basic and applied R&D. TSA maintains responsibility for testing and evaluation, and operational integration and deployment of new security technology. He also testified that TSA is engaged at a high level in the DHS S&T capstone Integrated Product Team process used to identify technology needs and prioritize R&D projects.

Dr. Oxley noted that the U.S. engaged in minimal explosives-related R&D. She testified that R&D in all areas related to detection was crucial, as well as performing a methodical study to identify likely explosive precursors from readily available materials.

Dr. Drury explained that human factors engineers use data on the performance of humans in complex systems to design systems that make better use of the distinct capabilities of both humans and automated machines—for instance, relying on machines to perform searches, but having humans evaluate an alarm. He stated that TSA and TSL do engage human factors engineers when developing new technology but that they could be doing more in this area.

During the question and answer period, the Members and witnesses discussed Federal Aviation Administration research and safety regulations on flammable liquids, screening the workforce, the security R&D budget and priorities, the frequent traveler program, and the process for creating and implementing new technologies.

4.6(n)—Sustainable, Energy-Efficient Transportation Infrastructure

June 24, 2008

Hearing Volume No. 110–110

Background

On Tuesday, June 24, 2008, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation met to review ongoing federal, State, academic, and industry research and development activities related to reducing life cycle energy consumption,

reducing fuel use and promoting sustainability for surface transportation infrastructure. The hearing also addressed technical, regulatory, social, and financial challenges to implementing new measures and to integrating new materials and technologies into existing transportation networks.

The witnesses were: (1) Mr. Paul Brubaker, Administrator, Research and Innovative Technology Administration (RITA), U.S. Department of Transportation; (2) Mr. Randell Iwasaki, Chief Deputy Director, California Department of Transportation (Caltrans); (3) Dr. Robert Bertini, P.E., Director, Oregon Transportation Research and Education Consortium; (4) Mr. Gerald Voigt, P.E., President and CEO, American Concrete Pavement Association; and (5) Dr. Christopher Poe, P.E., Assistant Agency Director, and Director, Center on Tolling Research, Texas Transportation Institute (TTI).

Summary of Hearing

The hearing addressed the following issues: needed R&D efforts to address energy and environment related challenges in the transportation sector; the role of the Federal Government, State agencies, academia, and industry in promoting technology transfer and how these entities should help policy-makers balance environmental impact with safety, cost, and efficiency; and standards development activities needed for materials and intelligent transportation systems. Chairman Wu opened the hearing by noting the need for fuel savings and curbing carbon emissions and wondered why policy-makers have failed to implement existing sustainable technologies, pointing to his home city of Portland, Oregon for what smart infrastructure can achieve. Ranking Member Phil Gingrey highlighted congestion and expense as two main problems with existing transportation infrastructure.

Mr. Brubaker highlighted RITA's contributions to nationwide R&D, listing several innovative possibilities. He stressed the importance of reducing fuel consumption by keeping traffic moving and detailed both opportunities for investment and the challenges facing sustainable transportation infrastructure. He focused on recycling materials such as fly ash and tire fibers for use in pavements and rubberized asphalt respectively, for both the environmentally friendly reason of not dumping huge amounts of these materials in landfills and because they often lead to lower costs for production and the extension of the life of the products. Mr. Brubaker mentioned research into nanotechnology, which could cut out the need for producing the high-cost steel rebar and extend the life of bridges.

Mr. Iwasaki argued that government works the best when goals are explicit and finite, and he outlined a few of California's accomplishments where this was the case. Some worthy projects include reducing congestion levels, carbon reduction and climate change, and recycling fly ash and tires. He talked about California's past accomplishments which serve as a model for other states, including using low-sulfur diesel and LED traffic lights. He also identified new projects that Caltrans is studying currently, including finding the shortest timed route for commuters as opposed to the shortest distance route.

Dr. Bertini explained how one determines the potential environmental impact of a given technology, future research needs, and the possible financing systems to promote sustainability. He also detailed what specific goals deserve immediate attention, such as congestion management strategies. He provided suggestions for how Federal, State, and local governments can respond to the various challenges, such as human resources in a multi-disciplinary field, that are facing innovative transportation technologies.

Mr. Voigt provided details on the use of concrete in infrastructure, promoting its energy efficiency, sustainability, and cost savings attributes, including future repair costs, fuel usage, and lower energy streetlights. He noted that a new sustainable technology initiative within the transportation industry's long-range road map is a top priority; however, he indicated a few key challenges, notably, a lack of a clear and universally accepted way to measure the sustainability of roadways and the fact that current specifications have not been replaced with specifications that require more sustainable practices. He also noted that new roads are often built without their life cycle cost in mind.

Dr. Poe explained how TTI is studying new technologies for green infrastructure, as well as the issue of traffic congestion and its affects on the environment. He noted that there were monetary and communication challenges to decreasing congestion and stop-and-go driving, and suggested that a collaborative approach would be best for solving these sorts of issues.

During the discussion period, each witness provided his perspective on key research priorities for the next transportation bill. They also offered Chairman Wu their ideas for the most important action the Federal Government could take to increase adoption of new transportation technologies. The rest of the discussion covered specific funding levels, life cycle costing, the importance of research, workforce training, and traffic information technology.

4.6(o)—The Low-level Plutonium Spill at NIST— Boulder: Contamination of Lab and Personnel

July 15, 2008

Hearing Volume No. 110–115

Background

On Tuesday, July 15, 2008, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation met to discuss an environmental, health, and safety (EH&S) incident at the National Institute of Standards and Technology's (NIST's) Boulder, CO facility. On June 9, 2008 researchers working there spilled a 0.25 gram sample. The spill contaminated the lab and a number of personnel working in the vicinity. Contamination spread to other areas of the building, and a small amount of the material was washed away in the lab sink. The Subcommittee held the hearing to examine the causes of the incident and the subsequent response to the situation by NIST employees, and to discuss improvements to environmental, health, and safety (EH&S) practices at NIST.

The witnesses at the hearing were: (1) Dr. James Turner, Acting Director of NIST; (2) Dr. Charles Miller, Director of the Office of

Federal and State Materials and Environmental Management Programs at the U.S. Nuclear Regulatory Commission (NRC); (3) Dr. Kenneth Rogers, one of five independent investigators appointed by NIST to review the June 9, 2008 plutonium spill, and former Commissioner of the U.S. Nuclear Regulatory Commission; and (4) Mr. Elmo Collins, Regional Administrator of the Region IV Office, U.S. Nuclear Regulatory Commission.

Summary of Hearing

Chairman Wu opened the hearing by stating that the Technology and Innovation Subcommittee was NIST's strongest supporter in Congress, highlighting the agency's excellent scientific and technical work and advocating for increased funding for the agency. He then expressed disappointment that recent events had cast doubts on NIST's dedication to EH&S practices. Referring to the plutonium spill, and a recent accident involving a laser at the NIST Gaithersburg facility, Chairman Wu stated that the hearing's purpose was not to assign blame but to assess the conditions that contributed to the June 9th accident and examine the EH&S practices and culture at NIST. Ranking Member Phil Gingrey echoed the Chairman's disappointment about NIST's EH&S practices. He stated that the accident could have been avoided if proper procedures and protocols had been followed. Representative Mark Udall expressed concern that NIST had been slow to inform all of the Boulder personnel and local and State officials about the accident.

Dr. Turner began by emphasizing that the most recent medical tests for the affected personnel did not reveal that these individuals were at an increased risk for cancer due to their exposure to plutonium. He also emphasized that he and all of NIST deeply regretted what had happened. He described NIST's investigation of the June 9th accident and acknowledged that several of the researchers working with the plutonium sample had not received the proper training and were not adequately supervised. He also acknowledged that the immediate aftermath of the spill was not properly handled. Dr. Turner described the steps taken NIST-wide immediately after the accident to ensure researchers were adhering to EH&S policies, but he also acknowledged that NIST needed to improve its management and oversight of EH&S in its labs. To that end, he announced that the Department of Commerce would establish a blue ribbon panel to examine the EH&S policy, procedures, and culture at NIST. Dr. Turner also assured the Subcommittee that no action would be taken against any personnel until the situation had been fully and thoroughly evaluated.

Dr. Miller outlined the NRC application and amendment process for nuclear material and he described NIST's obligation under their license amendment permitting the use of plutonium. These obligations include a radiation safety officer who must ensure license requirements are met and that all individuals working with, or in the vicinity of the source, are properly trained. Mr. Collins discussed the oversight and investigatory actions taken by the NRC. NIST informed the NRC 24 hours after the accident, and on June 12th, the NRC sent health physics inspectors to Boulder, and they issued a confirmatory action letter on July 2. In response to questions about the NRC's typical inspection frequency, Dr. Miller noted that based

on the type of work NIST was engaged in under their license, they were on a five-year inspection frequency. He also stated he was encouraged by the seriousness with which NIST was investigating and evaluating the incident and that he was hopeful this would encourage a broader evaluation of safe work practices.

Dr. Rogers discussed several of the findings from the independent review of the June 9th accident. He noted that the support for safety was not uniform across NIST and that some at NIST viewed spending on safety as competing for scarce resources; policies and procedures existed at NIST that could have prevented the accident but they were not enforced; the Boulder safety office was not adequately funded or equipped with equipment and personnel; and that there were numerous instances of communication breakdowns among key personnel that could have added more oversight to the use of the plutonium. His recommendations included: redoing the cost-benefit analysis for the use of certain types of nuclear materials; resuming work with radioactive material only after ensuring all involved are trained; better oversight by radiation safety officers; and undertaking a systematic analysis of all hazards across NIST labs.

4.6(p)—The National Windstorm Impact Reduction Program: Strengthening Windstorm Hazard Mitigation

July 24, 2008

Hearing Volume No. 110–117

Background

On Thursday, July 24, 2008, the Honorable David Wu presiding, the Subcommittee on Technology and Innovation met to review the activities of the National Windstorm Impact Reduction Program (NWIRP) and to examine the role of R&D in saving lives and reducing property losses from windstorms. The witnesses also discussed advances in wind hazard mitigation and methods of transferring the results of research into practice for code developers, builders, and property owners. Lastly, the witnesses provided testimony on the priorities for a NWRIP reauthorization, and any changes needed to increase the effectiveness of the program.

The witnesses were: (1) Dr. Sharon Hays, Associate Director, White House Office of Science and Technology Policy (OSTP); (2) Dr. Marc Levitan, Director, Hurricane Center at Louisiana State University (LSU) and an Associate Professor, LSU Department of Civil and Environmental Engineering; and (3) Ms. Leslie Chapman-Henderson, President and CEO of the Federal Alliance for Safe Home, Inc. (FLASH).

Summary of Hearing

The hearing examined NWIRP, a multi-agency R&D program, involving four federal agencies- the National Institute of Standards and Technology (NIST), the National Atmospheric and Oceanic Administration (NOAA), the National Science Foundation (NSF), and the Federal Emergency Management Administration (FMEA). The hearing focused on the following issues: the lack of funding that

has gone toward wind-hazard mitigation R&D relative to the escalating costs of windstorms; the effectiveness of the current federal hazard mitigation R&D portfolio, which emphasizes research for short-term weather prediction, in decreasing the losses from hazards; strategies for increasing the adoption of mitigation measures; and ideas and strategies to improve the program in a reauthorization bill. Chairman Wu opened by emphasizing the tragic effects of windstorms, expressing disappointment in the lack of attention and funding President Bush's Administration has shown NWIRP. He stated that looking forward to a reauthorization, the program might need restructuring. Ranking Member Phil Gingrey noted the Nation's increasing vulnerability to tornadoes and hurricanes, including in his home State of Georgia, and stressed the importance of funding for R&D to save lives and to mitigate damage. He noted that promoting the adoption of research into practical mitigation measures remains the biggest challenge for NWIRP.

Dr. Hays discussed how the NWIRP agencies receive input from stakeholders outside the government and noted that a biannual report from the Windstorm Working group would be issued soon. She stated that the Administration's disaster related R&D strategy was all-hazards, and she noted that this idea was also central to the 2003 RAND report on federal support for disaster related R&D. Dr. Hays also explained that planning for this type of R&D is through the President's Science and Technology Council's Subcommittee on Disaster Reduction.

Dr. Levitan commented on the vulnerabilities of and the strategies for protecting the built environment, identifying a few key areas where increased R&D efforts and technology transfer would be useful. He stated that NWIRP holds great opportunity for decreasing windstorm impacts, however due to lack of funding and focus, these benefits have not been realized. Dr. Levitan stated that the importance of understanding patterns of the wind storms is necessary for dealing with natural disasters. Computational engineering, performance-based design, and retrofit technologies are all crucial areas for advancement. He argued that NIST should become the lead agency for the program, and he also noted the significant challenge posed by technology transfer in terms of both funding and education and outreach. Major opportunities for rapid improvements include incorporating current research results into building codes and standards and developing design guides and software tools.

Ms. Chapman-Henderson discussed her desire to establish disaster safety as a public value in America. She emphasized strengthening existing buildings and building codes, as well as research and innovation. She also argued that the cycle of build-destroy-rebuild cannot be broken unless programs like NWIRP create and promote the adoption of mitigation measures before a violent windstorm strikes. Ms. Chapman-Henderson noted the great challenge of transforming research results into usable knowledge for the public and the building community. An emphasis on hazard reduction stands to reduce the cost of natural disasters significantly.

Appendix

BART GORDON, TENNESSEE
CHAIRMAN

RALPH M. HALL, TEXAS
RANKING MEMBER

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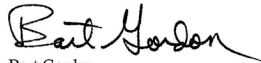
March 1, 2007

The Honorable John Spratt
Chairman
Committee on the Budget
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

Pursuant to the provisions of clause 4(f) of House Rule X of the Rules of the House of Representatives for the 110th Congress and Section 301(d) of the Congressional Budget Act of 1974, as amended, I am transmitting the Views and Estimates, including Additional and Minority Views, of the Committee on Science and Technology for Fiscal Year 2008.

Sincerely,



Bart Gordon
Chairman

BJG/af

Enclosure

cc: The Honorable Ralph Hall, Ranking Member, Committee on Science and Technology
The Honorable Paul Ryan, Ranking Member, Committee on the Budget

VIEWS AND ESTIMATES
COMMITTEE ON SCIENCE AND TECHNOLOGY
FISCAL YEAR 2008

The President's FY 2008 budget proposes \$143 billion in federal research and development (R&D) funding, a 1.4 percent increase over the FY 2007 level. The budget proposes increases for research programs within the American Competitiveness Initiative (ACI), as well as human space exploration, but proposes decreases in much of the remaining non-defense federal research and development portfolio. The Committee, like the Congress, is very concerned about our country's budget deficit and its impact on our economic strength. However, the Committee also urges the Budget Committee to recognize the contributions and benefits that research and development and science and technology investments have for our country's economic competitiveness, energy security, education standards, job growth, and environmental health.

The President's FY 2008 budget would provide \$11.4 billion for research within programs that are part of the ACI—the National Science Foundation, Department of Energy Office of Science, and National Institutes of Standards and Technology lab research and construction accounts. However, the Committee notes with concern that outside of the ACI programs, research and development for many agencies and programs would be cut compared to the FY 2007 level. For example, according to the American Association for the Advancement of Science (AAAS), the FY 2008 budget would reduce R&D funding for Department of Energy Applied programs (excluding Office of Science) by \$133 million or 9.2 percent; the Department of Homeland Security by \$15 million or 1.6 percent; the Environmental Protection Agency by \$20 million or 3.5 percent; and the National Oceanic and Atmospheric Administration by \$57 million or 9.5 percent. In addition, proposed funding for most agencies and programs (including NASA, the National Science Foundation, and the Department of Energy) is well below levels authorized in legislation passed by the Congress and signed into law by the President.

This year, the Committee plans to move legislation to refocus our country's science and technology priorities by:

- Enacting key recommendations of the National Academy of Sciences *Rising Above the Gathering Storm* report on U.S. competitiveness;
- Promoting a clean, affordable, reliable, and diverse energy supply based on the best and most efficient technologies;
- Ensuring that NASA priorities are balanced and adequately leverage expertise in aeronautics, science, and human space flight and exploration programs;
- Evaluating the Department of Homeland Security's research and development programs to ensure they are based on rigorous risk analysis of threats to our nation; and
- Moving beyond the basic questions of climate science and seeking to address specific regional and economic sector vulnerabilities.

The following is a more detailed analysis of the Committee's budget priorities, by subcommittee and agency.

SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

Department of Energy (DOE)

The Committee has jurisdiction over all Department of Energy civilian national laboratories, civilian energy research, development and demonstration programs, and activities related to the commercial application of energy technologies.

The Committee recognizes that there are many worthy programs at the Department of Energy and believes that the country will best be able to meet its energy goals by balancing long-term basic energy research with short-term research, development, demonstration, and commercial application of energy technologies and by not presuming technology "winners" and "losers."

Office of Science

Basic energy research plays an important role in enhancing the Nation's competitiveness, and the Committee believes the FY 2008 budget request for the DOE Office of Science of \$4.4 billion is a step forward in responding to near-term needs in this field. The request represents an increase of approximately \$600 million, or 16 percent over the appropriated FY 2007 level. However, it is important to note that

the request falls \$189 million short of the amount authorized in the *Energy Policy Act of 2005* (P.L. 109–58).

The Office of Science has maintained a long-standing role as steward of large world class scientific user facilities. However the Committee is concerned that construction and operation of facilities comes at the expense of actual funding for research in these facilities. This can be especially detrimental in the case of construction overruns or miscalculated operational costs of very large facilities, some of which carry multi-billion dollar price tags. The Committee notes with pleasure that the Spallation Neutron Source (SNS) at Oak Ridge National Lab will open on time and within the scope of the budget. As the Department moves forward with plans for additional large scientific facilities, it is important to demonstrate that lessons have been learned from successes such as the SNS. However it is equally important to closely examine cases such as the Superconducting Super Collider, which ultimately failed to be completed because of multi-billion dollar cost overruns and lack of political support. Early and comprehensive consultation with contractors and component manufacturers might have provided more realistic cost estimates. The Committee will find it difficult to support construction of such large facilities if demonstrable measures are not taken to assure due diligence in the areas of cost estimates and design.

Within the Office of Science, the Biological and Environmental Research (BER) program receives a 15 percent increase over the FY 2007 appropriated level, with a large portion of overall funding supporting the startup of three bioenergy research centers for investigating cellulosic biomass as an energy feedstock. The Committee notes that the Department's original plan included only two centers and roughly a third of the funding. As the Department moves forward, it should ensure that each center maintains distinct research capabilities, and not duplicate research being done by industry or within other Department of Energy programs or labs.

In addition, the Committee is pleased to see the request provide \$340 million for the Advanced Scientific and Computing Research (ASCR), an increase of 45 percent over the FY 2007 level. This would allow for the continued upgrading of the Leadership Class Facility (LCF) to peta-scale operations, making it the world's largest civilian high-performance computing system. Awareness of the role computational sciences can play in advancing U.S. industrial and scientific competitiveness is increasing rapidly, and the Committee urges the Department to continue awarding substantial amounts of run-time to private industry and universities to enhance that role.

Applied Energy Programs

The Committee is pleased to see the Administration's increased attention to a number of R&D programs within the Office of Energy Efficiency and Renewable Energy (EERE). However, increases in some renewable and efficiency R&D programs are mostly offset by considerable reductions to other important R&D programs, as well as programs to deploy existing and new technologies, including the Weatherization Assistance Program, Industrial Technologies Program, and Federal Energy Management Program.

For example, as in the FY 2007 budget request, the Administration would eliminate R&D in geothermal power, despite the fact that untapped geothermal sources could address a significant portion of our country's energy demand and do so in a reliable and clean manner. A comprehensive study by the Massachusetts Institute of Technology, released in January 2007, found that enough geothermal resources exist to supply 10 percent of the United States' future electricity requirements with minimal environmental impact and likely at competitive prices. Further, geothermal energy technologies are not fully mature and could benefit from further technology development and demonstrations.

If the country continues moving toward greater use of biofuels, the Committee believes it will be important to increase investment in Biomass and Biorefinery Systems programs at DOE. Under the President's budget, these programs would receive funding at a level almost double compared to FY 2007. However, the FY 2008 request for Vehicle Technologies R&D, which includes funding to spur the development of technologies for plug-in hybrid vehicles, would be reduced by \$6.4 million or four percent. The Committee finds that an overall cut in this program is unwise given that the responsibility for decreasing the Nation's dependence on oil from unstable or hostile regimes rests largely in programs to improve advanced vehicle technologies.

Nuclear Energy receives \$568 million for research and development, with a large portion of that dedicated to the Global Nuclear Energy Partnership (GNEP). For the Nuclear office, this represents an increase of \$220 million, or 64 percent over the

FY 2007 request, and \$347 million (157 percent) above the FY 2006 Congressionally appropriated amount.

The Administration unveiled the Global Nuclear Energy Partnership (GNEP) in 2006 as a plan to develop advanced, proliferation-resistant nuclear fuel cycle technologies that would maximize the energy extracted from nuclear fuels and minimize nuclear waste. The Committee notes, however, that GNEP has not had widespread support in Congress. In FY 2007, the Administration requested approximately \$250 million, but approximately \$80 million was appropriated. Nonetheless, the Administration's FY 2008 request for GNEP is \$395 million.

Chief among the Committee's concerns about GNEP is the cost of implementing the program (up to \$40 billion) and deploying a fleet of the required technologies on a commercial scale (more than \$200 billion). The Committee is also concerned with what appears to be a premature selection of technologies before the completion of a full system-wide analysis of the technologies required. DOE has a poor track record for carrying out large scale construction and operation of such projects without major cost and schedule overruns, and the Department has not responded in a way to allay these concerns with regard to GNEP. For these reasons and others, the Committee remains skeptical whether the very substantial increases for GNEP are warranted at this time.

Given our country's abundant domestic coal resources, the Committee believes that clean coal technologies should be part of the debate about providing a clean, reliable, efficient, and affordable energy supply. The Committee supports increases for the Fossil Energy office to investigate and develop clean coal and carbon capture and sequestration technologies, including the Clean Coal Power Initiative and the FutureGen project. However, given the continued high price of oil and natural gas, the Committee is disappointed that the FY 2008 budget once again proposes to eliminate all oil and gas R&D, including \$50 million authorized in the *Energy Policy Act of 2005* (P.L. 109-58) for unconventional on-shore and off-shore natural gas exploration technologies that would go largely to small, independent oil and gas producers.

The FY 2008 budget proposes \$8.4 million to fund the Office of Loan Guarantees, which will administer the Innovative Technology Loan Guarantee Program (LGP), also established in the *Energy Policy Act of 2005* (P.L. 109-58). The request assumes a loan volume of \$9 billion for large electric power generation projects, such as advanced nuclear and coal gasification with carbon sequestration programs that promote biofuels and clean transportation fuels, and new technologies in electricity transmission and renewable power systems. The Committee supports the LGP as a tool to help commercialize technologies that will result in significant reductions in carbon emissions. However, given the Department's poor track record with loan guarantees, in order to minimize liability for the Federal Government (and consequently, taxpayers), the Committee strongly urges DOE to act in a timely manner to develop regulations for the program that have been fully vetted in a public, merit-based prioritization process.

Advanced Research Projects Agency for Energy (ARPA-E)

Finally, the Committee believes that many R&D programs within DOE are often not well-suited to respond to the rapidly changing world of energy technology development, and greater collaboration with U.S. industry and academia could reap unprecedented benefits in this field. Therefore, the Committee intends to move legislation that establishes within the Department a new research and technology development agency known as the Advanced Research Projects Agency for Energy, or ARPA-E. The 2005 report by the National Academy of Sciences, entitled *Rising Above the Gathering Storm*, recommended establishing ARPA-E to coordinate high-risk, high-payoff energy technology research and development that private industry is not likely to pursue on its own. ARPA-E would be modeled on the successful DARPA program within the Department of Defense. Given the scale of the energy challenges facing our nation, ARPA-E would only be effective if funded at levels that allow for potentially transformational energy research.

National Oceanic and Atmospheric Administration (NOAA)

The President's FY 2008 budget request for the National Oceanic and Atmospheric Administration (NOAA) is \$3.96 billion, 2.7 percent below the FY 2007 appropriated funding. The President's budget requests for NOAA routinely exclude funding for a wide array of Congressionally-mandated projects, and some of this funding is redirected to Presidential priorities. However, in FY 2008, much of this funding is simply cut from the NOAA budget resulting in a lower funding request for NOAA.

National Weather Service (NWS)

The National Weather Service (NWS) is the only line office that receives an increase in the President's FY 2008 request for NOAA. The FY 2008 request for NWS is 6.5 percent higher than the 2006 enacted levels. The increase for the Tsunami Warning Network (\$17.2 million) includes funds to repair one of the weather data buoys that add to the enhanced real-time hurricane observations and storm monitoring as well as complete the 39 DART buoy network system.

The completion of the Tsunami detection network expands NWS's operational capabilities. However, the Committee is concerned that this is the only area where the Administration proposes to make an investment in improved forecasting to protect life and property. Further, the Committee is concerned that this increase may not be sufficient to fully cover all operational and maintenance requirements for current weather forecasting equipment, especially if the country experiences a year with high frequency of severe weather events and hurricanes that result in damage or loss to weather monitoring and forecasting equipment. The Committee believes that this level of funding will not enable NWS to move new monitoring and forecasting equipment from research to fully operational mode.

National Environmental Satellite Data and Information Service (NESDIS)

The President's FY 2008 budget request would increase the overall budget for the National Environmental Satellite Data and Information Service (NESDIS) by three percent (\$26 million). The budget for NESDIS is dominated by the procurement, acquisitions, and construction (PAC) accounts for the polar and geostationary satellite systems. The Operations, Research and Facilities (ORF) account for NESDIS contains the programmatic funding for management, processing, analyzing, and archiving data received from all of NOAA's weather monitoring equipment—ground-based and space-based. This account also supports a number of regional climate centers. The Committee notes with concern that the FY 2008 request for these accounts is \$20 million below the FY 2007 enacted levels.

The FY 2008 request also eliminates \$4 million in funding for NOAA–NASA Partnerships to facilitate the transfer of research to operations. The Data Centers and Information Services accounts are reduced by \$18 million from the FY 2007 enacted levels. While funding for these programs is small relative to the procurement of satellite systems, funding for data analyses, processing, management, and archiving is essential to obtain value from the large investments made in the satellites that gather and transmit data to support weather forecasting and climate prediction.

NOAA operates two satellite systems that collect data for weather forecasting. The polar satellites orbit the Earth and provide information for medium to long-range weather forecasts. The geostationary satellites gather data above a fixed position on the Earth's surface and provide information for short-range warnings and current weather conditions. Both of these systems are scheduled for replacement, and both new satellite series must be launched by 2014.

Based on investigation by the Committee and others, the polar satellite program has been found to have experienced serious problems including equipment damage, cost overruns, technical difficulties in development of new sensors, and poor management. The planned request for the last satellite in the current polar series POES in FY 2008 was \$62 million. However, the actual FY 2008 request is \$43 million above the original estimate. According to the Administration, the extra funds would cover rebuilding costs and storage costs for the N-Prime satellite damaged at the factory in 2003, support for testing of a European satellite, installation of NOAA instrumentation on a European satellite, and to restore N-Prime funding that was redirected to POES-N due to an unplanned delay in the launch of the POES-N satellite.

The Committee is very concerned that the procurement program for the new series of polar satellites, the National Polar-Orbiting Operational Environmental Satellite System (NPOESS), is now projected to cost in excess of \$4 billion above the original estimated cost, and that the FY 2008 budget request does not reflect the increased cost of this program. This satellite series was also supposed to provide continuity for a number of measurements required for the Nation's Earth sciences program. However, the Committee is concerned that neither the NOAA budget nor the NASA budget includes any funding to restore capabilities of the instrumentation eliminated from the NPOESS program in the restructuring of this program. As reported to the Committee, most recently in February of this year, climate change is occurring, and it may have a significant impact on weather and climate patterns across the Nation. At a time when our country needs additional information to prepare for and mitigate the impacts of climate change, we have no identified funding to sustain the basic monitoring system that now provides this critical information.

The current series of Geostationary Operational Environmental Satellites (GOES-N, O and P) are nearing completion. GOES-N was launched in May 2006, and the FY 2008 request of \$80.4 million will support the continued development, procurement and launch of the remaining GOES satellites scheduled for April 2007 and October 2008. The Committee learned in 2006 that the estimate for the new GOES series of satellites—GOES-R—was projected to be \$5 billion higher than the original estimate. NOAA is now restructuring and designing this program to achieve cost reductions, but the cost savings again will be achieved by reducing the number of satellites in the series as well as reducing the capabilities of the satellites. The Committee continues to have serious concerns about the development of these new satellite series both in terms of meeting our need for continuity of weather and climate data and in terms of the present and future impacts on the NOAA budget.

Oceanic and Atmospheric Research

The Office of Oceanic and Atmospheric Research contains over half of the research programs at NOAA. The President's FY 2008 budget reduces funding for this research by nearly \$11 million (three percent) below the FY 2007 enacted levels. The President's FY 2008 budget increases funding for Climate Research by \$23 million (13.5 percent); most of this increase is accomplished by redirection of funds from Congressionally-mandated projects.

The Presidential-appointed U.S. Commission on Ocean Policy released a report in 2004 (*An Ocean Blueprint for the 21st Century*) recommending doubling the federal ocean and coastal research budget over the next five years. However, no Presidential budget proposal since the report was issued has included substantial increases in ocean research funding at NOAA.

Environmental Protection Agency (EPA)

The FY 2008 budget request for the Environmental Protection Agency (EPA) is \$7.2 billion, \$800 million less than the FY 2007 appropriation. The FY 2008 budget proposal for EPA's Science and Technology programs is \$781 million. This includes \$754 million in the Science and Technology program account plus a transfer of \$26 million from the Superfund account to support Superfund-related research. However, starting with the FY 2007 budget request, the Administration instituted an accounting change and transferred the cost of operations and maintenance of all S&T facilities from the Environmental Program and Management account to the S&T account. When this transfer is accounted for, the actual FY 2008 S&T program request is reduced by \$65 million to \$716 million, an \$81 million reduction below FY 2007 enacted funding levels.

The Committee notes that EPA's Science Advisory Board reviews EPA's Science and Technology budget request each year, and since FY 2005, the Board's reports have indicated concerns about the erosion of EPA's budget for S&T. The Board's review of the FY 2007 budget proposal stated: "The erosion of research and development remains a serious impediment to the Agency's ability to meet its mission of protecting human health and the environment through science-based initiatives. This fall-off in the development of scientific knowledge will increasingly have international competitiveness dimensions as we lag our competitors in developing new technologies using new approaches. It is the opinion of the Board that EPA's research and development resources are grossly inadequate to address the scientific complexities of the Nation's environmental protection needs" (EPA-SAB-ADV-06-003). The Committee agrees that our country must have a more robust investment in environmental research and development if we are to maintain a healthy environment and a healthy economy.

SUBCOMMITTEE ON RESEARCH AND SCIENCE EDUCATION

National Science Foundation (NSF)

NSF is the primary source of federal funding for non-biomedical research conducted at colleges and universities, including 86 percent of funding for computer sciences, 77 percent of funding for mathematical sciences, 54 percent of funding for environmental sciences, 46 percent of funding for engineering, 40 percent of funding for the physical sciences, and 52 percent of funding for social and behavioral sciences. In addition, since its founding in 1950, NSF has maintained effective programs for improving science, technology, engineering and mathematics (STEM) education at all levels. NSF's funding of basic research across nearly all fields of science and engineering and its education programs to prepare the next generation of scientists and engineers, as well as to increase the scientific and technical literacy of

all Americans, provide the underpinnings for assuring future U.S. economic competitiveness and national security.

NSF continues to receive high marks for the effective management of its programs. The agency received its ninth consecutive “clean” opinion from an independent audit of its financial statements, with no material weaknesses reported. In addition, NSF is among a handful of agencies that have maintained “Green” successful ratings in four or more of the President’s Management Agenda initiatives, and all NSF programs evaluated to date by the Office of Management and Budget’s Program Assessment Rating Tool (PART) are among the 15 percent government-wide that have received the highest rating.

Because of NSF’s key roles in science and engineering research and education, there have been many calls to double the NSF budget. The President’s American Competitiveness Agenda announced last year also proposes to double the NSF budget over ten years. The President’s FY 2008 budget request would provide the second installment for achieving the Administration’s goal by providing \$6.4 billion for NSF, which is \$409 million, or 6.8 percent above the FY 2007 request, and \$513 million, or 8.7 percent above the FY 2007 continuing resolution. However, funding proposed in FY 2008 would still fall far below the level authorized by the *National Science Foundation Authorization Act of 2002* (P.L. 107–368).

While the Committee welcomes the Administration’s proposal to increase NSF funding, the proposal falls short by failing to include growth for the NSF K–12 STEM education programs. In fact, from FY 2004 through FY 2007, funding for the NSF K–12 STEM education programs has fallen by 47 percent. Under the FY 2008 request, K–12 STEM education funding would remain flat. The Committee believes resources devoted to this area are inadequate in light of the importance of ensuring a well educated STEM workforce.

Since 1950, NSF has been tasked with strengthening STEM education at all levels, and NSF’s education programs are unique in their peer review processes, their linkage to higher education, and their resulting capacity to develop new and improved educational materials and assessments, create better teacher training techniques, and move promising ideas from research to practice. To take advantage of the expertise and experience of NSF in STEM education, the Committee intends to move legislation this year to implement several initiatives developed during the previous Congress that will modify and enlarge existing NSF programs focused on teacher training and in-service teacher professional development. These provisions arose from the recommendations of a recent report of the National Academy of Sciences, *Rising Above the Gathering Storm*.

The NAS report, prepared by a panel of distinguished scientists, engineers and educators from academia and industry, recommended a series of action items that the panel found to be keys for ensuring the Nation’s economic competitiveness in the 21st century. The first and highest priority action item of the report is to increase substantially the number of STEM teachers who are well grounded in their subjects and skilled in pedagogical techniques for teaching science and math. This is the centerpiece provision of H.R. 362, *10,000 Teachers, 10 Million Minds Science and Math Scholarship Act*, which the Committee will take up early this year and which is one of several legislative measures to advance competitiveness and innovation that are expected to be considered by the full House of Representatives.

The Committee recommends that the NSF Education and Human Resources Directorate receive additional funding to expand and revise the NSF Robert Noyce Teacher Scholarship program, which will support efforts by colleges and universities to improve the education of STEM teachers and will provide scholarships for science, math, or engineering students who enter the program, take courses needed to become certified as teachers, and agree to teach for two years for each year of scholarship support.

SUBCOMMITTEE ON SPACE AND AERONAUTICS

National Aeronautics and Space Administration (NASA)

NASA’s FY 2008 budget request is \$17.3 billion, approximately \$690 million less than the amount stipulated for FY 2008 in the FY 2005 five-year budget plan that accompanied the President’s *Vision for Space Exploration* (VSE). That shortfall replicates the practice in each of the previous two years—in FY 2006 the Administration’s request was \$546 million less than pledged in the President’s VSE five-year budget plan; in FY 2007, the request was \$1.02 billion less. The Committee is very concerned about the cumulative effects of these budgetary shortfalls, which, coupled with the Office of Management and Budget under-budgeting for the costs of Space

Shuttle and the International Space Station (ISS) in that same five-year budget plan, create strains and stresses that are visible in all of the Agency's programs.

The Committee notes with concern that the FY 2008 budget request for the Exploration Initiative does not adequately account for what will be needed in FY 2008 to keep the Constellation program—which funds development of the Orion Crew Exploration Vehicle (CEV) and Ares Crew Launch Vehicle (CLV)—on track to be operational in 2014. The FY 2007 budget request shifted almost \$7 billion to the Constellation program relative to the previous year's five-year budget plan, but the result of that action has been a "hollowing out" of much of the rest of the Exploration Initiative, including cuts to exploration-related technology R&D and to ISS research funding. And, in spite of the \$7 billion infusion into Constellation, the operational date for the CEV remains at 2014. Moreover, all of NASA's human space flight programs have been given funding "challenges" in the budget request which will force the Agency to make additional cuts to pay for needed replacement spacecraft for its TDRSS data relay satellite system and for crew-cargo support of the ISS.

The Committee also continues to be concerned about proposed funding for Aeronautics programs. In the FY 2008 budget request, Aeronautics remains at a level that is less than a third of the funding provided in 1994—and significantly lower than the FY 2001 budget level. As a result, many aviation experts are worried about NASA's ability to continue supporting critical interagency research goals in air traffic management and aviation safety. NASA is a major participant in the interagency initiative to develop the next generation air traffic management system, and its R&D will be critically important to that effort. The interagency initiative assumes NASA will be given the resources necessary to carry out its R&D tasks.

In addition, the reductions in NASA's aeronautics budget have led to a situation where all but a small fraction of NASA's aeronautics funding is dedicated to in-house activities, with little money available to support R&D conducted in partnership with universities and industry. The Committee notes that this is likely to result in a diminution of new and innovative research concepts from academia as well as a reduction in the relevance of NASA's research to the needs of the aviation industry.

The Committee also is aware that NASA's science programs are facing significant stresses. Roughly \$4 billion was removed from the five-year budget plan for NASA's science programs over the last two years, resulting in significant disruptions. The FY 2008 budget request and its five-year run-out for the Earth Sciences program contain insufficient funds to undertake the missions recommended in the recently released National Academy of Sciences decadal strategy for Earth science research and applications. Even currently planned missions continue to suffer delays. The Global Precipitation Measurement (GPM) mission, originally scheduled for a 2007 launch, will now not fly before 2013. A similar situation can be seen in NASA's astrophysics program, which is projected to face a decline in funding of \$300 million between FY 2008 and 2011. Finally, funding for NASA's education programs is projected to decline over the next five years from the FY 2007 request level.

The Committee believes that NASA's space and aeronautics programs represent some of the Nation's most rigorous R&D initiatives. As such, they can inspire our young people, advance our understanding of the universe as well as our home planet Earth, and they can generate technological advances that will benefit both our quality of life and our economic competitiveness. That will only be possible with a balanced NASA program of science, aeronautics, and human space flight and exploration. If NASA is to be successful in carrying out the tasks it has been given by the White House and Congress, it is going to need resources commensurate with those tasks. Thus, the Committee believes that NASA should receive funding in FY 2008 closer to the level authorized in the *NASA Authorization Act of 2005* (P.L. 109–155) than to the level contained in the President's FY 2008 budget request.

Federal Aviation Administration (FAA)

The FY 2008 budget request for the Federal Aviation Administration's R&D programs contains a modest increase, with the projection of additional increases over the next five years. The Committee believes that the need for such R&D expenditures is clear, given the important role FAA R&D will play in promoting aviation safety and increased air transportation capacity and efficiency, as well as enabling informed international agreements on noise, emissions, and other environmental issues. For example, the FAA is the lead agency in the interagency effort to develop the next generation air traffic management system, and the success of that initiative will be dependent on the FAA receiving the resources needed to develop and implement the components of the next generation system. The Committee believes that FAA's R&D programs should receive no less than the President's FY 2008

budget request, and consideration should be given to augmenting the request if additional funds are available.

SUBCOMMITTEE ON TECHNOLOGY AND INNOVATION

National Institute of Standards and Technology (NIST)

The National Institute of Standards and Technology (NIST) is the Nation's oldest federal laboratory, with a mission to use measurement science, standards, and technology to enhance economic competitiveness and public safety. NIST's wide range of high-quality programs in support of U.S. industry puts it in an excellent position to play a key role in advancing American innovation and competitiveness.

The Committee notes that Congress has long been a supporter of the NIST lab programs, whose budget has increased by 130 percent in the past 15 years. Congress also has recognized the value of NIST's extramural programs by providing funding to maintain the existing national network of Manufacturing Extension Partnership (MEP) centers and a viable Advanced Technology Program (ATP).

The Administration's FY 2008 budget request proposes a four percent cut for NIST, compared to the FY 2007 appropriations level. The Committee feels this is the wrong decision for an agency with such a direct impact on the public welfare and economic competitiveness. While the President's American Competitiveness Initiative (ACI) proposes doubling the NIST lab accounts, it does so at the expense of the ATP and MEP. The President proposes to cut the MEP by 56 percent and to eliminate the ATP altogether.

The Committee believes that the public's investment in NIST has paid significant dividends to the Nation, and that overall NIST funding should be put on a path to double over the next ten years. However, what is needed is a balanced approach, which includes funding for the ATP, MEP, NIST labs, and construction, particularly at the Boulder, CO campus. The Committee believes that the Administration's repeated efforts to eliminate the ATP and dramatically reduce funding for the MEP are misguided. Both programs are proven public/private partnerships that have delivered significant returns on investment. For example, a recent survey of just a quarter of MEP clients reported over \$1.3 billion in cost savings directly attributed to the program's assistance as well as the creation of \$6.3 billion in new or retained sales and more than 53,000 jobs. Congress has expressed its strong support for these programs on multiple occasions, and the Committee will continue to support them.

Department of Transportation (DOT)

The Committee oversees surface transportation research and development (R&D) activities at the Department of Transportation (DOT). These activities are managed by several administrations within DOT, including the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). The Research and Innovative Technology Administration (RITA) is responsible for coordinating research portfolios across the Department. The Bureau of Transportation Statistics (BTS) is also a component of RITA.

While the Administration requested a \$4.3 million increase over the FY 2007 appropriated funding level of \$7.7 million for RITA, the Committee is concerned that the requested increase will not support the emerging research priorities identified by the recently released Transportation Research, Development and Technology Strategic Plan. Less than 10 percent of the total requested funding for RITA will go towards supporting R&D, and less than half of the requested funding will support coordination of DOT research activities. Five million dollars, an amount totaling more than the requested increase, is proposed for a nationwide global positioning system (GPS) system that will be developed on behalf of the U.S. Coast Guard (USCG), which is part of the Department of Homeland Security (DHS). While the Committee understands the need for technological expertise in developing important global positioning capabilities, important priorities identified in the strategic plan are left unfunded in this request. The Committee has not seen any justification for requiring RITA to perform this R&D, which may be more appropriately housed in the U.S. Coast Guard. The Committee believes more emphasis should be given to research coordination that supports energy efficiency, congestion reduction, and safety as emphasized in the RITA strategic plan.

In addition to those research priorities identified by RITA, the Committee urges that current research into intelligent transportation systems, materials technology, and other fields be leveraged to support enhanced mobility and energy efficiency. FTA's Research and University Research Centers account supports research and development related to public transit, training programs, and university research. The

Committee is pleased that FTA's multi-year research program plan includes improving the accessibility of transit and improving safety and security while considering the needs of the mobility-impaired population. The Committee is concerned that FTA will be limited in its ability to carry out needed research under the proposed FY 2008 budget, however, which is cut by six percent compared to FY 2007. The Committee recommends that funding for Research and University Research Centers be increased to the level authorized in *SAFETEA-LU* (P.L. 109-59).

Department of Homeland Security (DHS)

The Committee oversees the R&D activities of the Department of Homeland Security, which are primarily housed in the Science and Technology (S&T) Directorate and the Domestic Nuclear Detection Office (DNDO). The Committee is pleased that the Administration requested a 17 percent increase in funding for DNDO, but is concerned that the requested funding for the S&T Directorate is cut by over \$90 million (9.4 percent) from FY 2007. The requested cut to R&D activities within the S&T Directorate severely hampers the Department's ability to prevent or mitigate the effects of natural and manmade disasters through the use of advanced technology.

The Committee remains concerned that DHS lacks balance between long- and short-term research and between its various R&D missions. While the Committee is pleased that the proportion of requested funding designated for basic research has more than doubled from approximately five percent in FY 2007 to approximately 13 percent in FY 2008, the Department's R&D portfolio (including both S&T and DNDO) remains strongly weighted towards end-stage technology development with little focus on basic research. Moreover, the proposed cuts to the University Centers of Excellence program will further reduce the Department's investment in basic research. This funding also will be further diluted by the Administration's proposal to create additional Centers. In addition, the Committee is concerned that funding for emergent and prototypical technologies also remains low. Emphasizing short-term research makes the Department significantly less agile and responsive, and locks the country into a single technological response to emerging and future threats.

In addition, DHS is not properly balancing its research portfolio among R&D divisions. The Department's highest priorities in the FY 2008 budget request are nuclear detection and biological research. Although these may be important areas for research, the Committee has yet to see any formal risk assessment justifying this prioritization. The Committee is concerned that DHS is not making the necessary investments in explosives detection, cyber security, infrastructure protection, and border security technologies. A formal risk assessment and strategic plan is essential to ensure that the Department's resources are able to address both short- and long-term risks to the Nation, and DHS is overdue in submitting a report that will make certain that priorities are coordinated with a risk assessment. In addition, homeland security-related research is supported by a number of agencies, including the National Institute of Standards and Technology (NIST), the National Science Foundation (NSF), the Department of Energy (DOE) and others. The Committee is concerned that DHS has not leveraged these resources to their maximum benefit.

Finally, While the Department has a plan to improve responsiveness to customers, the Committee is concerned that research supported by S&T and DNDO ignores the needs of State and local government officials. Recent technologies developed and tested by the Department, including the counter-MANPADS system and nuclear material detection technology, have been unattractive to State and local users because of their high purchase and maintenance costs. The Committee strongly recommends a formal structure for processing the requests of and comments from State and local governments to ensure that technology coming out of DHS meets their performance and cost needs.

The United States Fire Administration (USFA)

The U.S. Fire Administration (USFA), now part of DHS, was created in 1974 to aid localities in reducing the loss of life and property from fires and related emergencies. The FY 2008 budget request for USFA is \$43.3 million, a 7.5 percent decrease over the FY 2007 enacted level. This is well below the level authorized (\$68.8 million) in the *United States Fire Administration Reauthorization and Firefighting Research Coordination Law* (P.L. 108-169).

The Assistance to Firefighters Grants program provides direct assistance to local fire departments for training, purchase of equipment, and other purposes. The FY 2008 budget request is \$300 million for the fire grant program. This is a \$362 million cut from the FY 2007 enacted level (a reduction of 55 percent), and \$700 million less than is authorized P.L. 108-375, which included the Assistance to Firefighters

Grant program reauthorization. In addition, the Administration has requested no funds for the Staffing for Adequate Fire and Emergency Response (SAFER) Program, which awards grants to fire departments for the purpose of hiring new firefighters. *SAFER* (P.L. 108–360) is authorized at \$1.13 billion in FY 2008 and received an appropriation of \$109 million in FY 2007. The Committee believes that both these important programs should receive higher funding, and that the Administration does not recognize the effectiveness and importance of these programs.

National Earthquake Hazards Reduction Program (NEHRP)

The National Earthquake Hazards Reduction Program (NEHRP) is an interagency program that Congress created in 1977 and reauthorized in 2004 in the *National Earthquake Hazards Reduction Program Reauthorization Act* (P.L. 108–360). It includes NSF, NIST, the Federal Emergency Management Agency (FEMA), and the U.S. Geological Survey (USGS), and aims to reduce the loss of life and property from earthquakes by improving emergency response, increasing understanding of earthquake risks, and improving earthquake engineering.

Funding for this program is authorized through FY 2009 at the following levels: FEMA, \$23 million; NIST \$13.3 million; NSF \$41.52 million; and USGS \$87.4 million. The complete NEHRP budget request for FY 2008 is not yet available; however, past Administration requests for this program have been lower than the amounts authorized. The Committee believes that, given the potential for catastrophic damage from earthquakes in this country, the NEHRP program should be adequately funded.

National Windstorm Impact Reduction Program (NWIRP)

The National Windstorm Impact Reduction Program (NWIRP) was authorized in 2004 (also in P.L. 108–360) as an interagency effort geared towards, improving scientific understanding of wind hazards and developing cost-effective measures to reduce the impact of wind hazards on lives and property through atmospheric research, code development, and creation of risk assessment tools. The participating agencies include NSF, NIST, FEMA, and NOAA.

Funding explicitly designated for NWIRP is not included in any of the participating agencies' budget requests for FY 2008, in spite of funding authorization totaling \$25 million: \$9.4 million for FEMA, \$9.4 million for NSF, \$4 million for NIST, and \$2.2 million for NOAA. The Committee believes that coordination and funding of NWIRP is critically necessary to save lives and reduce the economic costs of windstorms, which average \$1.1 billion annually.

<u>Bart Gordon</u>	<u>B. Z. Band</u>
<u>Nick Sampson</u>	<u>Dan Zilli</u>
<u>Jiffels</u>	<u>Charles McLaren</u>
<u>Jay McRae</u>	<u>Mike Ren</u>
<u>Barb Hill</u>	<u>Charles H. Wilson</u>
<u>Mark Udall</u>	<u>Bob Hill</u>
<u>Michael Webb</u>	<u>Russ Carnall</u>
<u>Eddie Bonice Johnson</u>	<u>Ben Chandler</u>
<u>Jim Hatke</u>	<u>[Signature]</u>
<u>Hank E. Whitel</u>	<u>Shelue Horley</u>
<u>Steven A. Nothman</u>	<u>Sharon Woolsey</u>
<u>Paul E. Kujasii</u>	<u>Jimmy Costello</u>

List of Signatures

Representative Bart Gordon
Representative Brian Baird
Representative Nick Lampson
Representative Daniel Lipinski
Representative Gabrielle Giffords
Representative Charlie Melancon
Representative Jerry McNerney
Representative Mike Ross
Representative Baron P. Hill
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SENIOR DEMOCRATIC WHIP

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AND INFRASTRUCTURE
CHAIRWOMAN, SUBCOMMITTEE ON WATER
RESOURCES & ENVIRONMENT
SUBCOMMITTEE ON AVIATION
SUBCOMMITTEE ON RAILROADS

COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON RESEARCH AND
SCIENCE EDUCATION
SUBCOMMITTEE ON INVESTIGATION AND
OVERSIGHT

CHAIR, TEXAS DEMOCRATIC DELEGATION

CONGRESSIONAL BLACK CAUCUS
CHAIR, 107TH CONGRESS



Eddie Bernice Johnson
Congress of the United States
30th District, Texas

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SCIENCE FUNCTION 250 FUNDING – FY08

In addition to the Views and Estimates provided by the Committee on Science and Technology, I would like the following programs at National Science Foundation to receive, at least, the following budget authorizations listed. The amount provided represents be how much I would like to be ADDED to the President's FY08 budget request. Rational is provided below.

PLUS-UP

FUNCTION 250: GENERAL SCIENCE, SPACE, AND TECHNOLOGY

NSF: Louis Stokes Alliances for Minority Participation (LSAMP)	+ \$2.6 million (6.5% increase)
NSF: Minority Post-Docs	+ \$162,000 (6.5% increase)
Historically-Black Colleges and Universities-Undergraduate	+\$7.5 million (25% increase)
Noyce Scholarships	+\$648,000 (6.5% increase)

RATIONALE

NSF: Louis Stokes Alliances for Minority Participation (LSAMP)

The LSAMP Program aims to increase the quality and quantity of students successfully completing science, technology, engineering and math (STEM) baccalaureate degree programs, and increasing the number of students interested in and qualified for graduate students. Though the FY08 NSF Budget Request to Congress lists this program as a priority funding area, the President's request of \$40 million is flat-lined from the FY07 request. A \$2.6 million increase is a modest 6.48 percent increase, double the rate of inflation.

NSF: Minority Post-Docs

The Directorate for Biological Sciences (BIO) at NSF offers two funding opportunities under this solicitation 1) Research Initiation Grants (RIG) and 2) Career Advancement Awards (CAA), with the goal of broadening the participation of scientists from groups underrepresented in the biological sciences in the U.S. Awards made by NSF must be

framed in such a way that they can be categorized as basic biology. NSF targets its awards to young investigators. For many young investigators, the research pipeline begins with an NSF award, followed by grants from NIH. The current FY08 request is flat-lined from FY07 numbers. The budget recommendation is an increase of 6.48 percent, double the rate of inflation.

Historically-Black Colleges and Universities-Undergraduate

The HBCU-UP program provides awards to enhance the quality of undergraduate science, technology, engineering, and mathematics (STEM) education and research at Historically Black Colleges and Universities (HBCUs); it is a critical tool to broaden participation in the Nation's STEM workforce. Support is available for Implementation Projects, Planning Grants, Education Research Projects, and Targeted Infusion Projects. Currently, the FY08 request is flat-lined; an increase of \$7.5 million represents a 25 percent increase request.

Noyce Scholarships

Strong math and science K-12 education is a key ingredient for encouraging minority participation in STEM fields. The Robert Noyce Scholarship program seeks to encourage talented science, technology, engineering, and mathematics majors and professionals to become K-12 mathematics and science teachers. The program provides funds to institutions of higher education to support scholarships, stipends, and programs for students who commit to teaching in high-need K-12 school districts. I recommend expansion and revision of the NSF Robert Noyce Teacher Scholarship program, which will support efforts by colleges and universities to improve the education of STEM teachers and will provide scholarships for science, math, or engineering students who enter the program, take courses needed to become certified as teachers, and agree to teach for two years for each year of scholarship support. The President's FY08 request flat-lines the program. A modest 6.48 percent (double the rate of inflation) increase of \$648,000 is requested.

In summary, these items at the National Science Foundation are key to our national competitiveness and to promoting diversity in our science, technology, engineering and mathematics workforce. NSF has a record of strong performance, and as a senior member of the Committee on Science and Technology, I will continue to advocate for appropriate authorization increases in programs important to diversifying our science and technology workforce. Thank you for considering my request.

Sincerely,



Eddie Bernice Johnson
Member of Congress

MINORITY VIEWS AND ESTIMATES
COMMITTEE ON SCIENCE AND TECHNOLOGY
FISCAL YEAR 2008 (FY08)

We are mindful that the Nation is in tight budget times, and we applaud the President for putting forward a budget that reduces the deficit and keeps America on track to balance the budget by 2012. We are pleased to see that the President understands the importance of research and development to our nation's security and competitiveness and has responded by increasing federal research and development spending in the FY08 budget request by \$3.5 billion, a three percent increase over the FY07 estimate. Within this overall budget, the President has substantially increased physical science and engineering research as part of the *American Competitiveness Initiative (ACI)*.

Department of Energy (DOE)

We are pleased to see that the Department of Energy's Office of Science received a seven percent increase over the FY07 request. This increase is consistent with the President's ACI, and will help America develop technologies to foster energy independence. Likewise, we are pleased that the budget continues to support the Global Nuclear Energy Partnership (GNEP) as a way to reduce the volume and toxicity of nuclear waste, and significantly increase the energy extracted from existing supplies of uranium. The Committee conducted three hearings on GNEP during the Republican-controlled 109th Congress, and we continue to believe that DOE could improve public and Congressional support for GNEP by conducting a comprehensive systems analysis of the advanced fuel cycle and its associated research facility needs.

We would like to note that the DOE Office of Science is making progress to balance its budget between core research and facilities and we understand the hard decisions that have to be made in maintaining this delicate balance. The DOE Office of Science plays an important part in the President's American Competitiveness Initiative and we support the 19.8 percent increase over the FY 2006 appropriated level.

We would particularly like to echo the disappointment that the majority has for the Administration's recommendation that the Petroleum Oil Technology and Natural Gas Technologies research and development programs be terminated as well as its recommendation that the Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Research Fund be repealed. In light of the fact that our country relies on fossil fuels for about 85 percent of the energy it consumes, it makes sense to continue funding R&D programs that will help us become more dependent on domestic sources of oil and gas rather than on foreign sources.

We would also like to highlight our agreement with the majority in their belief that clean coal technologies play an important role in our energy portfolio. We would like to reiterate coal's importance as a domestically abundant, low-cost fuel source, and are fully supportive of the increases in DOE's Office of Fossil Energy for coal related activities.

We would once again be supportive of a study on the establishment of an ARPA-E as was included in H.R. 6203 from the 109th Congress. A study would allow us to evaluate the program and inform the process of moving forward on the program.

National Aeronautics and Space Administration (NASA)

As made clear in the *NASA Authorization Act of 2005* (P.L. 109-155), the Committee, sought to enable NASA to thrive as a multi-mission agency with robust activities in human exploration of space, space science, Earth science and aeronautics. For FY08, the Act authorized \$18.7 billion for NASA to achieve these and other space-related programs. The Act also authorized the Administration's plan to return humans to the Moon, while at the same time completing the International Space Station, retiring the aging Space Shuttle in 2010, and developing new crew and cargo systems by 2014 to launch Americans beyond low-Earth orbit.

The current budget request seeks \$17.309 billion for NASA in FY08; substantially less than amounts authorized. Compared to the FY07 budget request, NASA is slated to receive a 3.1 percent increase, but the Committee notes that the FY07 appropriation was \$545.3 million below the request.

The Committee is concerned that NASA's current request, together with reductions in FY07 appropriations, may jeopardize NASA's ability to successfully accomplish its portfolio of missions, and is especially threatening to our manned space flight capabilities.

Much of the \$545 million FY07 reduction comes from the Exploration Systems account that funds the development of the new Orion crew exploration vehicle and

Ares launch systems. At a minimum, NASA anticipates a four year gap between the time the Shuttle is retired and first flight of the new Orion crew vehicle. Left unaddressed, the FY07 reduction may extend this gap, making our nation reliant on other countries to fly Americans into space. We find these delays unacceptable.

The Committee recognizes that many other countries are making rapid advances in space technology and that it is strategically important for the United States to remain a leader in continued, safe manned access to space. The funding shortfalls in Exploration Systems programs will need to be restored over the coming years to ensure the successful development of the Orion crew exploration vehicle and Ares launch vehicle, as well as manage a smooth transition of NASA's industrial base and skilled workforce.

Federal Aviation Administration (FAA)

FAA faces huge challenges researching, developing and deploying a next generation air traffic management system that will provide three times current capacity by 2025. Much of this work will be coordinated with the Joint Planning and Development Office, a collaborative effort with other federal departments and agencies.

While we support the Administration's FY08 request, we believe significantly greater R&D funding should be provided in future years to ensure successful and timely deployment of this vitally important system. Otherwise, our nation's airways will become gridlocked.

The request for FAA's Office Associate Administrator for Commercial Space Transportation (AST) is \$12.8 million, an increase of \$1.2 million over FY07 funding. The Committee continues to monitor licensing and regulation activities, and implementation of the *Commercial Space Launch Amendments Act of 2004* (P.L. 108-492) to ensure AST does not over-burden the emerging commercial space industry.

Department of Commerce—Technology Administration/National Institute of Standards and Technology (TA/NIST)

We strongly support the President's request of \$501 million for the National Institute of Standards and Technology's (NIST) laboratory accounts, a \$68 million (16 percent) increase over the FY07 enacted level. We also support the President's request of \$94 million for NIST's construction account, which is \$35 million (59 percent) more than the FY07 request. This funding is central to NIST's contribution to the President's ACI and will support NIST's consistently high-quality, cutting-edge research in a wide range of scientific and technical fields critical to U.S. industry.

However, we are disappointed with the President's request of only \$46 million for the Manufacturing Extension Partnership (MEP) program. This would cut the program by 56 percent from the \$106 million appropriated in FY07, leaving the national network of Centers with insufficient funding to maintain their assistance to small and medium-sized manufacturing firms. MEP has demonstrated its effectiveness as the only program (private or public) that offers direct technical assistance to small and medium-sized manufacturers.

Department of Commerce—National Oceanic and Atmospheric Administration (NOAA)

The majority's views and estimates for the National Oceanic and Atmospheric Administration (NOAA) compares the FY08 request to the FY07 enacted level. The FY07 Continuing Resolution provided a total appropriation (\$3.9 billion) for NOAA, but did not specify how NOAA should distribute that money in FY07. NOAA will submit a detailed spending plan to Congress, but until that plan is complete, we believe it is premature to assess how specific offices or programs at NOAA will fare under the FY07 enacted levels. Thus, we use the FY07 request as the basis for our comparison.

We support the FY08 budget request for NOAA of \$3.8 billion, a \$131 million (four percent) increase over the FY07 request. Given the current budget climate we believe this is a reasonable request for NOAA. However, we remain very concerned about cost overruns and technical challenges in NOAA's two weather satellite programs, the National Polar-orbiting Operational Environmental Satellite System (NPOESS) and the Geostationary Operational Environmental Satellite (GOES). Both programs will face major decision points and technical milestones in FY07 and FY08 and we intend to follow closely the progress made on these vital systems.

We strongly support the President's request of \$903 million for the National Weather Service, a \$21 million (two percent) increase over the FY07 request. This includes \$2 million for research on hurricane intensity, a new research initiative for FY08 that will improve and provide better hurricane predictions information for at-risk communities.

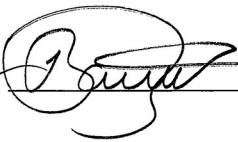
We support NOAA's request for \$30 million for satellite data product processing and distribution, and \$28 million for satellite product development, readiness and application. Our nation's multi-billion dollar investment in building and launching satellites pays off when the data from those satellites results in improved weather forecasts. These funding levels will ensure that the Nation can take full advantage of the large investment in satellites through timely and useful satellite data products.

National Science Foundation (NSF)

In keeping with the plan outlined in the ACI to double funding for research at NSF over the next 10 years, the FY08 budget request for NSF is \$6.4 billion, an increase of 6.8 percent, or \$409 million over the FY07 request. We are pleased to see the increases spread across all of the research fields NSF supports. We also recognize that while the \$751 million request for NSF education programs is a significant improvement (4.8 percent above the FY07 request), it is still nearly nine percent below the FY04 appropriated level, and the K-12 education funding within Education and Human Resources (EHR) is flat. Due to NSF's well-established role in preparing the future innovative workforce, we are disappointed that competitiveness funding increases at NSF have not included EHR. The minority endorses the proposed overall budget level proposed for NSF, while acknowledging that even with the proposed increases, funding still lags behind the levels authorized in the *National Science Foundation Authorization Act of 2002* (P.L. 107-368).

Department of Homeland Security (DHS)

We continue to practice close oversight of the research and development programs of the Department of Homeland Security and are pleased with the overhaul of the Department's Science and Technology Directorate over the past year to better align research programs with specific needs. However, we note that the budget request for S&T includes an \$83.1 million reduction in addition to transfers of \$90.1 million. This reduction will hamper the Department's efforts within the Infrastructure and Geophysical research office to provide community-based infrastructure assessments and advanced first responder technologies. We also remain concerned about the Directorate's ability to fully leverage university research communities, particularly given proposed reductions to the Centers of Excellence. We urge that the S&T Directorate be supported at least at an even level from FY 2007 funding.


Ralph McHale 

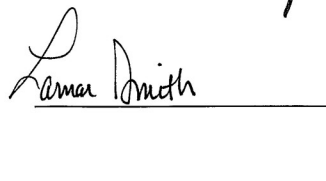
Ken Albert  Fred D. Lucas

Vernon J. Ehlers  Jo Bonner

Judy Beckett  Penneyne

Don L. Lipp  Tom F. Gentry

Chil. D. D.  N. D. D.

Lamar Smith  Brian P. Gilley

3.000000

Robin Smith _____

ADDITIONAL VIEWS OF REP. BOB INGLIS:

I am of the same mind as the Science Committee as to most of the observations presented in the Views and Estimates, but I would like to comment further on the Manufacturing Extension Partnership (MEP). When I was on the Budget Committee, we waged war against "corporate welfare." Many people attack MEP as the worst offenders and examples of the saying, "if you offer something for free, a line will form."

However, the government can and should support certain types of research and development, if (1) the technology faces barriers to adoption in the market, and (2) the national interest overrides the market's timing. Hydrogen is an excellent example of this. We need to reduce our dependence on foreign oil. The costs and technological barriers of a hydrogen economy slow the rate of adoption. Therefore, it is in our national interest to fund the research and development (and especially basic research).

MEP can be a challenge to criticize because it impacts individuals in a way that endears it to many people. Companies in my district have taken advantage of this program. However, the government helping small manufacturing firms to be more efficient cuts both ways. It champions the little guy, but sounds an awful lot like a handout aimed at specific types of businesses. I'm concerned that MEP is crowding out an entire industry of small businesses and entrepreneurs that could be providing consulting services to manufacturers. I support the President's request to reduce funding to this marginal program in a time where other initiatives deserve higher priority.

BART GORDON, TENNESSEE
CHAIRMAN

RALPH M. HALL, TEXAS
RANKING MEMBER

U.S. HOUSE OF REPRESENTATIVES
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February 28, 2008

The Honorable John Spratt
Chairman, Committee on the Budget
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

Pursuant to the provisions of clause 4(f) of House Rule X of the Rules of the House of Representatives for the 110th Congress and Section 301(d) of the Congressional Budget Act of 1974, as amended, I am transmitting the Views and Estimates, including Additional and Minority Views, of the Committee on Science and Technology for Fiscal Year 2009. In addition, I am transmitting recommendations to comply with Sec. 207(e) Oversight of Government Performance as required in the FY2008 Budget Resolution.

Sincerely,



Bart Gordon
Chairman

BJG/af

Enclosure

cc: The Honorable Paul Ryan, Ranking Member, Committee on the Budget
The Honorable Ralph Hall, Ranking Member, Committee on Science and Technology

VIEWS AND ESTIMATES
COMMITTEE ON SCIENCE AND TECHNOLOGY
FISCAL YEAR 2009

The President released his FY 2009 budget proposal on February 4, 2008. Overall, the \$3.1 trillion budget request includes \$147 billion for R&D. Once again, the Committee, like the Congress as a whole, is very concerned about our country's budget deficit and its impact on our economic strength. However, the Committee also urges the Budget Committee to recognize the contributions and benefits that research and development and science and technology investments have for our country's economic competitiveness, energy security, education standards, job growth, and environmental health. In particular, the Committee encourages the Budget Committee to use as guidelines the funding levels included in two major authorizing bills signed into law last year—the *America COMPETES Act* (P.L. 110–69) and the *Energy Independence and Security Act of 2007* (P.L. 110–140).

Last year, H.R. 2272, the *America COMPETES Act* (COMPETES) passed the House of Representatives (367–57) and the Senate (by Unanimous Consent) on August 2, 2007 and was signed into law by the President on August 9, 2007. A response to the 2005 National Academies' report *Rising Above the Gathering Storm*, COMPETES seeks to ensure U.S. students, teachers, businesses, and workers are prepared to continue leading the world in innovation, research, and technology. The law implements recommendations from the *Gathering Storm* report, and specifically:

- Authorizes \$33.6 billion over fiscal years 2008–2010 for science, technology, engineering, and mathematics (STEM) research and education programs across the Federal Government;
- Keeps research programs at NSF, NIST and the DOE Office of Science on a near-term doubling path;
- Helps to prepare new teachers and helps current teachers improve their skills through NSF's Noyce Teacher Scholarship Program and Math and Science Partnerships Program;
- Creates the Technology Innovation Program (TIP) at NIST (replacing the existing Advanced Technology Program or ATP) to fund high-risk, high-reward, pre-competitive technology development at small entrepreneurial firms with high potential for public benefit;
- Puts the Manufacturing Extension Partnership (MEP), which provides cost-shared technical assistance to small manufacturers to modernize their operations, on a path to doubling over 10 years; and
- Establishes an Advanced Research Projects Agency for Energy (ARPA-E), a nimble and semi-autonomous research agency at the Department of Energy to engage in high-risk, high reward energy research.

The FY 2009 budget request proposes funding increases for physical sciences research programs as part of the American Competitiveness Initiative (ACI), many of which are consistent with increases authorized in COMPETES. However, the Administration's budget ignores or neglects several core areas of COMPETES, including math and science education activities at NSF, manufacturing and technology stimulus programs at NIST, and important energy programs including ARPA-E. The Committee asks the Budget Committee to reject these cuts proposed by the Administration and include funding for these important COMPETES programs.

In addition, this year, the Committee plans to move reauthorizing legislation in several areas within the Committee's jurisdiction, which will set appropriate funding levels (where applicable) for agencies and programs and make necessary programmatic changes. These authorizations include:

- NASA;
- Small Business Innovation Research (SBIR) program;
- U.S. Fire Administration; and
- National Nanotechnology Initiative (NNI), a multi-agency program to ensure U.S. leadership in nanotechnology involving NSF, NIST, DOE, DHS, DOT, EPA, and NASA, among other agencies.

The following is a more detailed analysis of the Committee's budget priorities, by Subcommittee and agency. In addition, the Committee has provided a section on Oversight of Government Performance, as required by Sec. 207(e) of S.Con.Res. 21 (the FY 2008 Budget Resolution). Additional charts also are attached showing each agency's FY 2009 budget request compared to FY 2008 appropriations and authorized levels if available.

SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

Department of Energy (DOE)

The Committee has jurisdiction over all Department of Energy civilian national laboratories, civilian energy research, development and demonstration programs, and activities related to the commercial application of energy technologies.

The Committee recognizes there are many important programs at the Department of Energy that are essential to ensuring our ability to harness and utilize energy from diverse sources now and into the future. The Committee believes our energy research and development programs must include a continuum of investments from long-term basic energy research through to demonstration and testing of promising new technologies to expedite their acceptance into the marketplace.

Office of Science

Basic research plays a critical role in enhancing our nation's competitiveness, and the Committee believes the FY 2009 budget for the DOE Office of Science of \$4.7 billion is a step forward in addressing our near- and long-term needs. The request represents an increase of approximately \$700 million or 18 percent over the appropriated FY 2008 level. The Committee believes strong support for basic energy research is needed to achieve major breakthroughs in technologies that will enable our country to secure the energy supplies we need for the future while addressing the challenges of climate change. In addition, basic research in energy sciences supports the education and development of scientists and engineers in a wide array of key areas such as mathematics, computer sciences, and advanced material sciences.

The Office of Science has maintained a long-standing role as steward of large world-class scientific user facilities. However, the Committee is concerned that the expertise to construct and manage these facilities may diminish over the next several years with a wave of imminent retirements. There does not appear to be a significant effort to make it easier to bring in top talent and pass on institutional knowledge in a timely fashion, and so the Committee encourages a review of recruiting and hiring practices to ensure a free-flowing pipeline of such talent in the near future. The Committee appreciates the increased facilities operation hours proposed in the Basic Energy Sciences and Nuclear Physics programs, and continues to support optimal utilization of current facilities even as new facilities are planned.

The Committee fully supports a restoration of funding for the U.S. contribution to the International Thermonuclear Experimental Reactor (ITER) fusion project and research towards a proposed International Linear Collider (ILC). The Committee recognizes that the international agreement approved by Congress for ITER went into force in October 2007, and withdrawal of the U.S. from ITER in violation of this agreement would result in a penalty of—500 million (approximately \$750 million). In addition, the credibility of the United States as a reliable partner in large international research projects will be significantly undermined if corrective actions are not taken.

The Committee recognizes that while no formal international agreement currently exists for the ILC, research towards this project is closely coordinated among the U.S., Europe, and Asia. The Committee also supports the High Energy Physics program moving forward with the planned neutrino experiment at Fermilab and the University of Minnesota until a final decision on the level of U.S. participation in the ILC is made.

The Committee supports the FY 2009 request for the Basic Energy Sciences program of \$298 million above the FY 2008 enacted level. The Committee is pleased that the Basic Energy Sciences program is following up on its recent applications-driven workshops with specific research programs acting on their consolidated recommendations, including programs in electrical energy storage, carbon sequestration, and solar energy.

In addition, the Committee supports the Administration's request for increases in the Advanced Scientific Computing Research (ASCR) and the Biological and Environmental Research (BER) programs. The proposed increase for the ASCR program increase is five percent over the FY 2008 enacted levels. This program supports a wide variety of research activities throughout the Department as well as research activities of other federal agencies, in the extramural research community, and in the private sector. The requested increase of four percent over FY 2008 enacted levels for BER will enable the Department to further fund the three Bioenergy Research Centers designated in 2007, and in particular, to accelerate research on cellulosic biomass energy conversion and other improvements in bioenergy production. The Committee supports this increase.

Energy Efficiency and Renewable Energy

In the push to discover new energy resources and technologies the contribution of efficiency and conservation to the Nation's energy portfolio is often overlooked and understated. This FY 2009 Administration budget request is no exception. The President's proposal of \$1.26 billion for the Energy Efficiency and Renewable Energy program at DOE represents a 27 percent cut from FY 2008 congressional appropriations, with key energy efficiency programs bearing a large brunt of the decreases.

However, the Committee is pleased that proposed funding for the Geothermal Technology Program increased by \$10 million to a total of \$30 million in FY 2009, but notes that this is still far short of the \$95 million authorized in the *Energy Independence and Security Act of 2007* (P.L. 110-140). The Committee strongly believes the proposed cuts in funding for Solar Energy, Hydrogen, Industrial Technologies, and the Weatherization Program are unjustified and unwise.

The proposed funding for the Solar Energy program would be decreased by \$12.4 million, a seven percent reduction, to a total of \$156.1 million in FY 2009, which is also \$93.9 million below the level authorized in the *Energy Policy Act of 2005* (P.L. 109-58). The Committee also notes that the *Energy Independence and Security Act of 2007* (P.L. 110-140) specifically authorized an additional \$7 million for research in thermal energy storage for concentrating solar power and \$10 million for a solar energy workforce development program in FY 2009.

Heavy industry accounts for approximately one-third of energy use in the U.S., and the Industrial Technologies Program (ITP) at DOE has maintained a long and successful history of developing technologies and deploying them in industry, despite being funded at one-third of the levels from as recently as FY 2000 (\$175 million). The Department's own web site states that "ITP's efforts have resulted in over 160 technologies successfully reaching the marketplace, providing significant economic and environmental impacts for the United States." The Committee believes that the Administration's request of \$62 million is inadequate to address the scale of challenges in industrial efficiency, and reap the public benefits of advances in this area. To restore this program, the *Energy Independence and Security Act of 2007* (P.L. 110-140) calls for \$190 million in FY 2009, and the Committee strongly recommends that the program be funded as close as possible to this level.

The Committee believes the proposed budget for "Water Power" is much too low. Research in marine and hydrokinetic energy was authorized in the *Energy Independence and Security Act of 2007* at a level of \$50 million in FY 2009. The Administration's budget request provides \$3 million for both conventional hydropower and marine and hydrokinetic energy research. The Committee believes that a much higher level of federal effort is needed to take advantage of this underdeveloped renewable resource in an environmentally friendly manner.

The Committee feels strongly that advances in energy efficiency technologies coupled with sound conservation practices offer the lowest cost and easiest way to balance our national energy needs, and that the Federal Government must play a leadership role in supporting both. While the requested 13.5 percent increase in Building Technologies is commendable, advances in this area are hindered if deployment programs at the Department do not pick up where this vital research and development leaves off. The proposal to zero out the Weatherization program at DOE represents the most shortsighted of the Administration's proposed cuts. And despite token increases, the Federal Energy Management Program (FEMP) remains chronically under-funded given its charge of increasing the efficiency of the entire Federal Government. If the pipeline for energy efficiency technologies and practices is to continue to flow from the laboratory shelf to the marketplace, deployment programs such as these must continue to receive strong federal funding.

Fossil Energy

As underscored by the Committee's unanimous support for carbon capture and sequestration research, development, and demonstration legislation included in the *Energy Independence Security Act of 2007* (P.L. 110-140), the Committee is supportive of the increase requested for Fossil Energy to develop more efficient coal-fired power plants and advanced technologies for demonstrating integrated systems of carbon capture and sequestration. The budget request for FY 2009 includes an increase of 21 percent over the FY 2008 enacted funding for the Clean Coal Power Initiative, FutureGen, and the Fuels and Power Systems program. Because coal provides 50 percent of our nation's electric power, the Committee believes it is critical that we make substantial investments in clean coal technologies, especially in carbon capture and sequestration to help reduce the emissions of greenhouse gases associated with electric power production.

The Committee is concerned about the Department's recent announcement that it intends to restructure the FutureGen program due to projected cost increases in the program. First announced in 2003, FutureGen was promoted as a near-zero-emissions power plant that would combine electricity and hydrogen production. Congress has funded the Administration's requests for this program through appropriations of \$174 million over the past five years. The Department's revised FutureGen initiative will now focus on carbon capture and sequestration technologies at multiple commercial sites being planned by private interests. This proposal is intended to capitalize on industry's investment in Integrated Gasification Combined Cycle (IGCC) clean coal power plants by providing the funds for the CCS component of the IGCC power plants. The Committee recognizes the need to accelerate the development of carbon capture and sequestration technologies and will continue to monitor this program to ensure that it delivers the capability we need in the most cost-effective and rapid time frame possible.

The Committee is disappointed that once again the Administration proposes to eliminate all oil and gas R&D, including the \$50 million authorized in the *Energy Policy Act of 2005* (P.L. 109-58) for unconventional onshore and offshore natural gas exploration technologies that was primarily intended for small, independent oil and gas producers.

Nuclear Energy

The Administration request for Nuclear Energy (NE) is \$629.7 for research and development with nearly half of that request dedicated to the Advanced Fuel Cycle Initiative which is focused on implementing the Global Nuclear Energy Partnership (GNEP). For NE's Research and Development programs, this represents approximately \$191.7 million above the FY 2008 enacted funding level (\$438 million).

The United States has been conducting research on the reprocessing of spent nuclear fuel since 2002 under the Advanced Fuel Cycle Initiative (AFCI). In 2006, the Administration announced a change in this program when it unveiled GNEP as its plan forward to develop advanced, proliferation-resistant nuclear fuel cycle technologies that would maximize the energy extracted from nuclear fuels and minimize nuclear waste. The Committee notes that GNEP has drawn criticism based on the substantial costs estimated for implementing the program and the technical challenges associated with developing, demonstrating and deploying advanced technologies for recycling spent nuclear fuel that do not separate plutonium. Last fall, the National Academies issued a report expressing similar concerns. The FY 2009 request is \$301.5 million, substantially higher than the FY 2008 enacted funding for GNEP of \$181 million. The Committee remains concerned about financial and technical difficulties with implementing GNEP as currently proposed by the Administration, but finds general research activities on a closed nuclear fuel cycle to be worthwhile.

Although the FY 2009 budget request eliminates funding for the University Reactor Infrastructure and Education Assistance program, it does include directions to Nuclear Energy, through its Energy Research Initiative process, to designate at least 20 percent of the R&D appropriated funds for purposes of supporting R&D activities at university research institutions through competitive awards focused on advancing nuclear energy technology. While the Committee is supportive of this effort to help universities expand their R&D capabilities and strengthen the nuclear science programs at institutions of higher education, the Administration's proposal is not an adequate replacement for the University Reactor Infrastructure and Education Assistance program.

ARPA-E

On August 9, 2007 the President signed into law the *America COMPETES Act* (P.L. 110-69) which authorized the establishment of an Advanced Research Projects Agency for Energy, or ARPA-E. Like other provisions in the COMPETES Act, this followed on the direct recommendation of the National Academies' report, *Rising Above the Gathering Storm*, which called for an ARPA-E to fill the gap in the existing energy programs by performing high-risk, high-reward R&D in collaboration with the university and private sector. ARPA-E is intended to be unique not only in the type of research it conducts, but also in how it conducts that research.

The COMPETES Act calls for initial year funding of \$300 million, with such sums thereafter. The *Gathering Storm* report and other legislative proposals in Congress called for subsequent years to be funded at levels exceeding \$1 billion. However, the Administration has failed to request funding for this critical program. The establishment of ARPA-E is a priority for the Committee, and we strongly encourage funding

for the initial year of this program at \$300 million, with expectations that full operations will eventually exceed \$1 billion.

Innovative Technology Loan Guarantee Program

The FY 2009 budget requests \$19.9 million to administer the Innovative Technology Loan Guarantee Program established in Title XVII of the *Energy Policy Act of 2005* (P.L. 109–58). The FY 2008 omnibus appropriations bill included \$38.5 billion for loan obligation authority for FY 2008 and FY 2009. Within that authority, \$18.5 was designated for nuclear power facilities, \$6 billion for coal-based power generation and industrial gasification facilities, \$2 billion for advanced coal gasification projects, \$10 billion for renewable and efficiency projects and \$2 billion for front end advanced nuclear facilities. The Administration's FY 2009 request does not seek additional loan obligation authority, but requests extension for the loan authority until 2011 for nuclear facilities and a 2010 extension for all other projects.

Final regulations for the Loan Guarantee Program were issued in October 2007. The Committee is supportive of this program as a financial tool to support commercialization of innovative technologies that will result in significant reductions in carbon emissions.

National Oceanic and Atmospheric Administration (NOAA)

The President's FY 2009 budget request for the National Oceanic and Atmospheric Administration (NOAA) is \$4.2 billion, nearly five percent above the FY 2008 enacted funding. The Committee is very pleased to see the Administration increase the request for NOAA. The previous years' budget requests for flat or reduced funds as compared to current year funding were unrealistic and have prevented NOAA from making the investments required to improve forecasting, further our understanding of climate and weather patterns, and to better manage our coastal and ocean resources.

The National Weather Service (NWS) request is two percent over the FY 2008 enacted funding level. Much of the increase for NWS is to provide for the mandatory pay raise and other inflationary operation and maintenance costs and does not represent an increase in program funding. The Administration's request does include some important investments in key forecasting equipment including the Advanced Weather Interactive Processing System, the Wind Profiler Network, and for Hurricane Forecast Modeling. However, the small overall increase may not be sufficient to fully cover all operational and maintenance requirements for NWS, especially if our country experiences a year with high frequency of severe weather events and hurricanes that result in damage or loss to weather monitoring and forecasting equipment. In addition, the request will not enable NWS to move new monitoring and forecasting equipment from research to fully operational mode.

The President's budget request would increase the overall budget for the National Environmental Satellite Data and Information Service (NESDIS) by 21 percent (a \$203 million increase). The budget for NESDIS is dominated by the procurement, acquisitions and construction (PAC) accounts for the polar and geostationary satellite systems. Also reflected in this increase is \$74 million in funding to develop and deploy high priority climate sensors that were de-manifested from the National Polar-Orbiting Operational Environmental Satellite System (NPOESS) in 2006. The Committee supports this increase in funding for climate sensors. Maintaining the continuity of climate data records is extremely important if we are to expand our understanding of changing climate patterns and their potential impacts on our society and our environment.

The Operations, Research and Facilities (ORF) account for NESDIS contains the programmatic funding for management, processing, analyzing, and archiving the data received from all of NOAA's weather monitoring equipment—ground-based and space-based. This program accounts for data processing and analyses at data centers located in Kentucky, North Carolina, Maryland, and West Virginia. This account also supports a number of regional climate centers. The FY 2009 request for these accounts once again is significantly below the FY 2008 enacted levels. While funding for these programs is small relative to the procurement of satellite systems, funding for data analyses, processing, management, and archiving is essential to obtain value from the large investments made in the satellites that gather and transmit the data to support weather forecasting and climate prediction.

NOAA operates two satellite systems that collect data for weather forecasting. The polar satellites orbit the Earth and provide information for medium to long-range weather forecasts. The geostationary satellites gather data above a fixed position on the Earth's surface and provide information for short-range warnings and current weather conditions. Both of these systems are scheduled for replacement.

Both of these new satellite series must be launched around 2014 to avoid gaps in satellite data.

The Committee continues to follow the procurement programs for these two satellite series very closely. In addition, the Committee continues to have serious concerns about the development of these new satellite series both in terms of meeting our need for continuity of weather and climate data and in terms of the present and future impacts on the NOAA budget. The Committee remains concerned about the progress of the NPOESS program. Development of a key sensor continues to be behind schedule and to require additional funds. The Committee believes the requested level of funding for NPOESS is the minimum required to ensure this satellite procurement continues to move forward, meet the planned launch schedule, and avoid in gap in polar satellite coverage.

The current series of Geostationary Operational Environmental Satellites (GOES-N, O and P) are in the final stages of development. The majority of the increase in the FY 2009 request in the GOES program is to initiate the procurement of the new GOES-R series. The Committee supports the requested increase and notes the importance of providing sufficient funds in the early stages of procurement of a new satellite series to adequately develop and assess preliminary designs for satellite instruments. The reduction in funding for the GOES-R program that occurred in the FY 2008 appropriations process may result in schedule delays and cost increases to the overall program. The Committee encourages a robust overall budget for NOAA that accommodates the procurement of this vital satellite system.

The Government Accountability Office reported in October 2007 that the estimate for the new GOES series of satellites—GOES-R—was \$7 billion, but could rise by as much as an additional \$2 billion. The Committee believes NOAA's decision to obtain independent cost estimates and to restructure the program to achieve cost reductions to reduce technical risks was sound. However, the Committee is concerned the cost savings that will be achieved by reducing the number of satellites in the series may not be cost effective in the long run. The Committee supports the Administration's decision to include an option of four additional satellites in the solicitation for the GOES-R program.

Oceanic and Atmospheric Research

The Office of Oceanic and Atmospheric Research contains more than half of the research programs at NOAA. Again, the budget proposes to reduce these programs, this year by nearly \$16 million (four percent) below the FY 2008 enacted levels. Most of the reductions are within the Ocean, Coastal, and Great Lakes program. Climate Research and Weather and Air Quality Research receive small increases in the overall budget proposed while the budget for Ocean, Coastal and Great Lakes Research is significantly reduced. The overall budget allocation for research at NOAA is inadequate to support the future needs of the Agency and the Nation for improved forecasting and management of natural resources.

The Presidential-appointed U.S. Commission on Oceans released its report in 2004 recommending that Congress double the federal ocean and coastal research budget over the next five years. No budget proposal since the report was issued has included increases in ocean research funding at NOAA that would achieve a doubling of funding for ocean research programs. Once again, the Administration's budget request for this area of research is cut below current funding levels.

Environmental Protection Agency (EPA)

The FY 2009 budget request for the Environmental Protection Agency (EPA) is \$7.1 billion, approximately \$400 million less than the FY 2008 enacted budget for the Agency. The bulk of the reduction has once again come from the State and Tribal Assistance Grants, the account that funds maintenance and upgrading of wastewater treatment infrastructure across the Nation.

The President's FY 2009 proposal for EPA's Science and Technology (S&T) programs is \$790 million. This includes \$763.5 million in the Science and Technology program account plus a transfer of \$26.4 million from the Superfund account to support Superfund-related research. This request reflects approximately one percent increase from the FY 2008 enacted level of \$785.7 million, which was broken out into \$760 million for S&T programs generally and \$25.7 million for Superfund research. The majority of this increase comes from a \$19.8 million addition to the homeland security research division of the Office of Research and Development (ORD).

The EPA's Science Advisory Board reviews EPA's S&T budget request each year. Since their report on the FY 2005 budget proposal, the Board's reports have indicated concerns about the erosion of EPA's budget for S&T. Their review of the FY 2008 budget proposal stated, "The mission of the Environmental Protection Agency

is to protect human health and the environment. To do that in an effective and efficient way requires a deep understanding of environmental science and technology. However, between 2004 and the proposed 2008 budget, the overall support for Research and Development has declined by 25 percent in inflation adjusted terms" (EPA-SAB-STC-031407).

The Committee shares the Board's views on this issue and supports the reinvigoration of environmental research and development through a real increase in funding for EPA's S&T programs. The Committee believes investments in research and development will return dividends in the form of more cost-effective environmental protection programs and a cleaner, healthier environment.

SUBCOMMITTEE ON RESEARCH AND SCIENCE EDUCATION

National Science Foundation (NSF)

The National Science Foundation (NSF) is the primary source of federal funding for non-biomedical research conducted at colleges and universities, including 86 percent of funding for computer sciences, 77 percent of funding for mathematical sciences, 54 percent of funding for environmental sciences, 46 percent of funding for engineering, and 40 percent of funding for the physical sciences. In addition, since its creation in 1950, NSF has been tasked with strengthening science, technology, engineering and mathematics (STEM) education at all levels. NSF's education programs are unique in their peer review processes, their linkage to higher education, and their resulting capacity to develop new and improved educational materials and assessments, create better teacher training techniques, and move promising ideas from research to educational practice.

NSF's funding of basic research across nearly all fields of science and engineering and its education programs to prepare the next generation of scientists and engineers, as well as to increase the scientific and technical literacy of all Americans, provide the underpinnings for assuring future U.S. economic competitiveness and national security.

Recognizing the key role of NSF in science and engineering research and education and responding to the recommendations of the National Academies report, *Rising Above the Gathering Storm*, Congress authorized substantial funding increases for NSF in the recently enacted *America COMPETES Act* (P.L. 110-69). In addition to providing for a budget doubling for NSF over seven years, COMPETES takes advantage of the expertise and experience of NSF in STEM education by modifying and enlarging existing NSF programs focused on teacher training and in-service teacher professional development. These provisions respond to the first and highest priority action item of the *Gathering Storm* report, which is to increase substantially the number of K-12 STEM teachers who are well grounded in their subjects and skilled in pedagogical techniques for teaching science and math.

The President's FY 2009 budget request would provide \$6.854 billion for NSF, which is \$822 million, or 13.6 percent above the FY 2008 appropriations level and \$472 million, or 6.4 percent below the FY 2009 authorization level. While providing robust growth for the NSF research accounts, the President's budget proposal provides only a 4.6 percent increase for NSF's K-12 STEM education programs, which falls far short of providing the funding called for in COMPETES. In particular, the Robert Noyce Teacher Scholarship program would receive \$103 million less than the authorized amount and the Math and Science Partnerships, which is the principal program for teacher professional development of current STEM teachers, would receive \$60 million less than authorized.

The Committee recommends that the NSF Education and Human Resources Directorate receive \$995 million for FY 2009, which is the authorized level and is \$205 million above the request. The additional funding would be used to fully fund the Robert Noyce Teacher Scholarship program, which will provide scholarships for STEM majors who take tailored courses needed to become certified as teachers and agree to teach for two years for each year of scholarship support, and to fully fund the Math and Science Partnerships. In addition, the increase will support COMPETES initiatives to increase the number of undergraduate degrees in STEM fields and the number of graduate STEM degrees in emerging, interdisciplinary fields that are important for innovation and economic development. The Committee recommends that this \$205 million be added to the President's request for NSF, thereby providing NSF with total funding of \$7.059 billion for FY 2009.

SUBCOMMITTEE ON SPACE AND AERONAUTICS

National Aeronautics and Space Administration (NASA)

NASA's FY 2009 budget request is \$17.6 billion, approximately \$400 million less than the amount stipulated for FY 2009 in the FY 2005 five-year budget plan that accompanied the President's *Vision for Space Exploration* (VSE). That shortfall replicates the practice in each of the previous two years—in FY 2007 the Administration's request was \$1.02 billion less than pledged in the President's VSE five-year budget plan; in FY 2008, the request was \$690 million less. The Committee is very concerned about the cumulative effects of these budgetary shortfalls, which, coupled with the Office of Management and Budget's under-budgeting for the costs of Space Shuttle and the International Space Station (ISS) in that same five-year budget plan, have created strains and stresses that are visible in all of the Agency's programs.

The Committee notes with concern that in spite of the fact that the *NASA Authorization Act of 2005* (P.L. 109–155) directs NASA to launch the Crew Exploration Vehicle (CEV) “as close to 2010 as possible,” the FY 2009 budget request not only doesn't provide any additional funding to move the CEV operational date closer to 2010, it only provides funding sufficient to deliver the CEV in 2015—a year later than the date directed by the President in his 2004 *Vision for Space Exploration*. In addition, the FY 2009 budget request would do nothing to reverse cuts to much of the rest of the Exploration Initiative, including cuts to exploration-related technology R&D and ISS research funding. Moreover, all of NASA's human space flight programs face funding challenges in the out-years of the budget request, including that no funding has been identified for post-2010 Shuttle transition and retirement costs; reserves in the ISS and Constellation programs remain extremely low or negative; and funding proposed for post-Shuttle ISS crew and cargo support is so reduced that even NASA itself thinks it is likely to prove inadequate.

The Committee also continues to be concerned about proposed funding for Aeronautics programs. In the FY 2009 budget request, Aeronautics remains at a level that is only one-fourth to one-third as much as the funding provided in 1994—and significantly lower than the FY 2001 budget level. As a result, many aviation experts are worried about NASA's ability to continue supporting critical interagency research goals in air traffic management and aviation safety. NASA is a major participant in the interagency initiative to develop the next generation air traffic management system, and its R&D will be critically important to that effort. The interagency initiative assumes NASA will be given the resources necessary to carry out its R&D tasks.

In addition, the reductions in NASA's Aeronautics budget have led to a situation where all but 16 percent of NASA's FY 2009 Aeronautics funding is dedicated to in-house activities, with little money available to support R&D conducted in partnership with universities and industry. The Committee notes that this is likely to result in a diminution of new and innovative research concepts from academia as well as a reduction in the relevance of NASA's research to the needs of the aviation industry.

The Committee also is aware that NASA's science programs are facing significant stresses. Roughly \$4 billion was removed from the five-year budget plan for NASA's science programs over the last three years, resulting in significant disruptions. The FY 2009 budget request and its five-year run-out requests funds for a number of new space and Earth science initiatives, the majority of which will cost over \$500 million, and several of which will have costs that exceed several billion dollars. While the Committee is pleased that the FY 2009 budget request will initiate two of the missions recommended in the National Academy of Sciences decadal strategy for Earth science research and applications, and includes several new research projects within the science account, the Committee is very concerned that no new funding was included in NASA's science account to pay for these additional programs. Instead, funds are simply shifted among the various parts of the science account—an approach that runs a high risk of proving unsustainable.

The Committee believes that NASA's space and aeronautics programs represent some of the Nation's most challenging and exciting R&D initiatives. As such, they can inspire our young people, advance our understanding of the universe as well as of our home planet Earth, and they can generate technological advances that will benefit both our quality of life and our economic competitiveness. That will only be possible with a balanced NASA program of science, aeronautics, and human space flight and exploration. If NASA is to be successful in carrying out the tasks it has been given by the White House and Congress, it is going to need resources commensurate with those tasks. Thus, the Committee believes that NASA should receive

additional funding in FY 2009 above the level contained in the President's FY 2009 budget request.

Federal Aviation Administration (FAA)

The FY 2009 budget request for the Federal Aviation Administration's R&D programs contains an increase over the FY 2008 level, but provides less than is authorized for R&D in FY 2009 in H.R. 2881, the House-passed *FAA Reauthorization Act of 2007*. The Committee believes that the need for such R&D expenditures is clear, given the important role FAA R&D will play in promoting aviation safety and increased air transportation capacity and efficiency, as well as enabling informed international agreements on noise, emissions, and other environmental issues. For example, the FAA is the lead agency in the interagency effort to develop the next generation air traffic management system, and the success of that initiative will be dependent on the FAA receiving the resources needed to develop and implement the components of the next generation system. The Committee believes that for FY 2009, the FAA's R&D programs should receive no less than the funding authorized in H.R. 2881.

TECHNOLOGY AND INNOVATION SUBCOMMITTEE

National Institute of Standards and Technology (NIST)

The National Institute of Standards and Technology (NIST) is a non-regulatory agency of the Department of Commerce and the Nation's oldest federal laboratory. Its mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science and supporting the development of technical standards. NIST's wide range of high-quality programs puts it in an excellent position to play a key role in enhancing U.S. competitiveness.

The *America COMPETES Act* provided the first comprehensive authorization of NIST's programs in 15 years, putting NIST on a 10-year path to doubling by authorizing balanced increases for both the intramural research laboratories and the extramural industrial technology programs. However, the Administration's FY 2009 budget proposes only \$638 million for NIST, 28 percent lower than the amount authorized in *COMPETES*. The request includes increases for the intramural programs while eliminating or severely reducing funding for the extramural programs. The Committee believes this is a mistake, as the industrial technology programs have strong track records and serve a critical function in supporting U.S. competitiveness.

The Committee believes that the proposal to eliminate federal support for the Manufacturing Extension Partnership (MEP) is particularly problematic. Since 2000, the Nation has lost 3.4 million manufacturing jobs, 272,000 of which were in 2007 alone. MEP is the only federal program that specifically targets small- and medium-sized manufacturers to help them modernize their operations, improve their competitiveness, and reduce or reverse job losses. According to a survey commissioned by NIST, small- and medium-sized manufacturers who used MEP services in FY 2006 created or retained 52,000 jobs, increased or retained sales of \$6.8 billion, leveraged \$1.7 billion in new private-sector investment, and generated cost savings of \$1.1 billion. The Committee strongly supports this program, and does not agree with the Administration's stated position that MEP can operate without federal funding.

The Committee also is disappointed to see no funds requested for the Technology Innovation Program (TIP). TIP was created in *COMPETES* to provide cost-shared support for innovative technology development by small- and medium-sized companies and joint ventures, updating and building upon the proven success of the Advanced Technology Program (ATP). The Committee has heard testimony that there is a systematic lack of private venture capital for high-risk, high-reward, seed-stage technology development, creating an urgent need for programs such as TIP to fill this gap. A failure to fund these programs risks sacrificing opportunities for U.S. technical advancement and long-term economic growth. The Committee believes that TIP plays an important role in supporting U.S. innovation, and that reducing or eliminating funding for it would significantly reduce U.S. economic competitiveness.

The budget request includes funding to complete the construction of high-performance laboratory space at the NIST campus in Boulder, CO. The Committee continues to support this project and believes it will significantly enhance NIST's missions.

Department of Homeland Security (DHS)

The Committee oversees the R&D activities of the Department of Homeland Security (DHS) which are primarily housed in the Science and Technology (DHS S&T) Directorate and the Domestic Nuclear Detection Office (DNDO). The Committee is pleased that the research and development budget is increased significantly for both DHS S&T and DNDO. The Administration has requested an increase of \$38.5 million to \$868.8 million for DHS S&T, which includes \$736.7 million for the research account. For DNDO, the Administration has requested \$563.8 million, an increase of \$79.4 million.

The Committee remains concerned that DHS lacks balance between both long- and short-term research and between its various R&D missions. While the Committee is pleased that the Under Secretary is committed to a strong investment in long-term basic research (defined as eight years or longer to development), the Department's R&D portfolio (including both DHS S&T and DNDO) appears to remain strongly weighted towards end-stage technology development with little focus on basic research in spite of assertions that basic research accounts for 20 percent of the total investment. Moreover, the proposed cut to the University Centers of Excellence program will further diminish the Department's investment in long term basic research. And, the minimal funding proposed would be further diluted by the Administration's plan to create additional Centers, potentially forcing Centers to seek private funding in order to conduct R&D critical to their missions. The Committee believes that emphasizing short-term research makes the Department significantly less agile and responsive, locking our country into a single technological response to emerging and future threats.

The Committee also believes that DHS is not properly balancing its research portfolio among R&D divisions. The Department's highest priorities, as indicated by the funding request, remain nuclear detection and biological research. While these might be the most important areas, the Committee has yet to see any formal risk assessment justifying this prioritization of nuclear detection and biohazard research in spite of repeated requests in the 110th Congress.

Thus, while the Committee is pleased to see an increase in funding in many critical areas such as explosives detection, cyber security, infrastructure protection, and border security technologies, the Department's request is only a small step in the right direction. A formal risk assessment is essential to ensure that the Department's resources are able to address both short- and long-term risks to the Nation.

In addition, homeland security-related research is supported by a number of agencies, including the National Institute of Standards and Technology (NIST), the National Science Foundation (NSF), the Department of Energy (DOE) and others. The Committee is concerned that DHS has not leveraged these resources to its maximum benefit.

Finally, while the Department has a plan to improve responsiveness to customers, the Committee is concerned that research supported by S&T and DNDO ignores the needs of State and local government officials. Recent technologies developed and tested by the Department, including the counter-MANPADS system and nuclear material detection technology, have been all but rejected by state and local users because of their high purchase and maintenance costs. Moreover, DNDO once again requests funding for the Advanced Spectroscopic Portal detection technology in spite of serious reservations on the part of Congressional investigators, the Government Accountability Office, and others about their effectiveness. The Committee strongly recommends a formal structure for processing reviews and comments from end users and evaluators to ensure that technology coming out of DHS meets performance and cost requirements. The Department must also streamline testing and evaluation protocols, as well as work openly with expert agencies, such as NIST, to provide customers with valid and useful test results.

U.S. Fire Administration and FIRE Grants

The Committee oversees the U.S. Fire Administration (USFA), housed within the Federal Emergency Management Agency (FEMA) at the Department of Homeland Security (DHS). The Committee believes that the President's FY 2009 budget does not adequately fund USFA and continues the Administration's neglect of programs for firefighters. The FY 2009 request of \$40.9 million is 5.5 percent (\$2.4 million) below the FY 2008 enacted level. This year, the Technology and Innovation Subcommittee reported out H.R. 4847, a bill to reauthorize the Fire Administration. H.R. 4847 authorizes USFA at \$70 million for FY 2009. Members of the fire service community urged funding the agency at this level when they testified at a Technology and Subcommittee hearing in October of last year.

Through training opportunities, fire education and awareness programs, data collection, fire policy analysis, and other services, USFA provides important leadership to the Nation's first responders. The Committee is concerned that the Administration's request, which is \$29 million below the proposed authorization, will not meet the full demand for USFA leadership and programming that exists from firefighters and public safety personnel around the country. Additionally, the Committee is concerned that the Administration proposes to transfer USFA from a stand-alone account to FEMA's Operations, Management, and Administration account in FY 2009. This move could further compromise funding for the agency. The Committee will exercise oversight to ensure USFA remains intact.

The Committee also oversees two programs that provide funding opportunities to local fire departments to meet their equipment and staffing needs: the Assistance to Firefighters Grant (AFG) program and the Staffing for Adequate Fire and Emergency Response (SAFER) grant program. For FY 2009, the Administration requests \$287 million for the AFG program and, as in previous years, no funding for the SAFER grant program. This is a 49 percent decrease (\$273 million) from the FY 2008 funding level for AFG and a 100 percent decrease (\$190 million) for the SAFER program over FY 2008. The FY 2009 request is \$713 million below the authorized level for the AFG program (P.L. 108-375) and \$1.2 billion below the authorized level for SAFER (P.L. 108-136). The Committee believes that the President's FY 2009 request for the AFG and SAFER programs continue to ignore the growing pressures on local fire departments as they are called on to prepare for and respond to an increasing array of hazards. The Committee believes that funding the AFG program well below the authorized level, and providing zero funding for SAFER, neglects the needs of firefighters and the community's they serve.

Department of Transportation (DOT), Surface Transportation

The Committee oversees surface transportation research and development (R&D) activities at the Department of Transportation (DOT). These activities are managed by several administrations within DOT, including the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). The Research and Innovative Technology Administration (RITA) is responsible for coordinating research portfolios across the Department. The Bureau of Transportation Statistics (BTS) is also a component of RITA.

While the Committee is pleased that the Administration requested the authorized amount of \$39 million for RITA, the Committee is concerned that the requested increase will not support the emerging research priorities identified by the 2006 Transportation Research, Development and Technology Strategic Plan. Just over 10 percent of the total requested funding (\$1.5 million) for RITA will go toward supporting R&D, and less than half of the requested funding will support coordination of DOT research activities. Nearly \$5 million, an amount totaling more than the requested increase, is proposed for maintenance of a nationwide global positioning system (GPS) system that will be carried out on behalf of the U.S. Coast Guard (USCG), which is part of the Department of Homeland Security (DHS). While the Committee understands the need for technological expertise in developing important global positioning capabilities, important priorities identified in the strategic plan are left unfunded in this request. The Committee has not seen any justification for requiring RITA to perform this R&D, which may be more appropriately housed in the U.S. Coast Guard (which requests \$16 million for R&D activities in FY 2009). The Committee believes more emphasis should be given to research coordination that supports energy efficiency, congestion reduction, and safety as emphasized in the RITA strategic plan.

In addition to those research priorities identified by RITA, the Committee urges that current research into intelligent transportation systems, materials technology, and other fields be leveraged to support enhanced mobility and energy efficiency. FTA's Research and University Research Centers account supports research and development related to public transit, training programs, and university research. The Committee is pleased that FTA's multi-year research program plan includes improving the accessibility of transit and improving safety and security while considering the needs of the mobility-impaired population. The Committee is concerned that FTA will be limited in its ability to carry out needed research under the proposed FY 2009 budget, however, which is cut by \$5 million from FY 2008 to \$60 million. The Committee recommends that funding for Research and University Research Centers be increased to the authorized level of \$69.8 million in FY 2009.

The increase in funding for all components of research, development, and technology within the Federal Highway Administration will provide an important resource for transportation officials around the Nation. The Committee is pleased to see a strong investment in surface transportation research, development, and de-

ployment, which is increased by \$27 million from FY 2008 to \$196.4 million. Additionally, the increase of \$8.4 million to \$110 million for intelligent transportation systems (ITS) will support important developments in technology for safety and energy efficiency. The increase of \$2 million to \$26.7 million in the training and education account will support technology transfer from research results at FHWA. The Committee strongly supports this proposed funding.

The FHWA research, development, technology, and education investment of \$66.4 million in infrastructure research has an appropriate focus on bridges following the collapse of the I-35W bridge in Minnesota in August 2007. The Committee is pleased that technology transfer is also a portion of this program, as technology deployment to the user community is a crucial step in meeting FHWA's important goals of improving infrastructure longevity, safety, and performance.

SEC. 207(E) OVERSIGHT OF GOVERNMENT PERFORMANCE

Under Sec. 207(e) of S.Con.Res. 21 (the FY 2008 Budget Resolution), committees were directed to review programs within their jurisdictions to root out waste, fraud, and abuse in program spending.

In the 110th Congress, the Science and Technology Committee re-established the Subcommittee on Investigations and Oversight (I&O) to help identify places where waste, fraud or abuse could create savings for the federal taxpayer. Early in this Congress, the Subcommittee held a hearing on a Department of Defense aeronautics research program (DP-2) which had survived as an item of Congressional interest for more than a decade. Over the years, more than \$60 million had been spent on this program with no clear need, no clear client, no clear mission and no clear technical accomplishments. Following that hearing, the Appropriations Committee acted to terminate funding for this program.

Much of what the Committee has found falls into the realm of maladministration. Program after program seems to be badly managed, with important work being starved of funding as a result. For example, a world class environmental research lab at the Savannah River National Lab has been effectively de-funded by the Department of Energy, its 40 years of research abruptly terminated, for no good reason.

In addition, in a supposed effort to save money, EPA set about closing their library system, a step that would deny to their own researchers as well as the interested public, access to unique collections of materials on chemicals and the environment. No plan to put those materials on line was in place when EPA undertook this "cost savings" effort and no cost estimate of what a proper effort to digitize their holdings was ever developed. EPA management claimed they would save money through digitization, but since they made no effort to digitize records, even as they shuttered their library doors and filled dumpsters with materials, it is difficult to take the agency's proposal seriously. Under pressure from this Committee and others, the EPA stopped their closure program, but not before irreversible harm had occurred to some of the holdings and facilities.

The National Polar Orbiting Environmental Satellite System (NPOESS) also has been so badly managed by NOAA, NASA, and the U.S. Air Force that it has suffered from cost overruns of many billions of dollars. In addition, this program suffered from inaccurate and overly optimistic cost estimates from its inception. To keep the overall cost growth down, the Administration approved a re-scoping of the program in 2006 that jettisoned sensors essential to tracking climate change. However, these sensors are critical for understanding climate change and its impacts, and alternate plans must be implemented and funded to maintain continuity of these data. So the "savings" gained by removing these sensors from the NPOESS program are not savings at all. The cost of the sensors will now be borne by other programs at NOAA and NASA. While the Administration has included some initial funding in the new budget request to restore several climate sensors and some funding to initiate work at NASA on priority monitoring projects identified by the National Academy last year, there is still no comprehensive budget plan to ensuring the continuity of Earth observations needed to anticipate and address the impacts of climate change. Therefore, the cost overruns associated with unrealistic cost projections and poor management of NPOESS exceed the simple bottom line increases to that program.

Unfortunately, rewarding bad management with budget cuts would be counterproductive to the desires of Congress and the public. There is broad-based support for seeing environmental science facilities and weather satellites funded and operating. Further cuts in these budgets would only jeopardize our ability to acquire vital weather and climate forecasting information. There is no cheap fix for some

of the problems that the Committee has uncovered and no obvious savings for taxpayers in fixing these problems, but the problems must be addressed.

There is one area of potential savings toward which the Budget Committee may wish to turn its attention. The I&O Subcommittee has learned of a software development tool created as part of an acquisition by the National Reconnaissance Office that holds the promise of reducing software development time, and coding errors, by half. The Federal Government budgeted more than \$65 billion for IT systems in FY 2008, with another \$43 billion in intelligence-related acquisitions that appear (based on the limited information available in unclassified sources) to be IT-related. A very high proportion of these expenditures are for software development. If the costs of development could be cut in half by using this tool, and by developing other across-the-board development tools that would reduce costs, the taxpayer could see tens of billions of dollars in savings year-in and year-out.

The *Clinger-Cohen Act of 1996* requires OMB to analyze, track and evaluate the risks and results of major government investments in information systems. The Budget Committee might consider directing OMB to investigate this tool and begin coordinating the development and deployment of this and similar tools that can realize savings across the government. This is an area where serious efforts at savings have still not been undertaken, but the pay-off could be enormous. The Committee on Science and Technology would be happy to work with the Committee on the Budget to pursue this matter.

FIGURE 1 Funding for PL 110-69, America COMPETES Act (dollars in millions)													
Programs	President's FY2008 Request	COMPETES Act FY2008 Authorization	Omnibus Approps*	Delta Omnibus/ FY08 Auth	%	Delta Omnibus/ President FY08	%	President's FY2009 Request	COMPETES Act FY2009 Authorization	Delta President FY09/ COMPETES	%	Delta President FY09/Omnibus	%
NIST													
Scientific & Technical Research and Services	500.5	502.1	440.5	(61.6)	-12%	(60.0)	-14%	535.0	541.9	(6.9)	-1%	94.5	21%
Construction & Maintenance	93.9	150.9	180.5	9.6	6%	66.6	71%	99.0	86.4	(12.6)	-15%	(61.5)	-36%
Technology Innovation Program (TIP)	0.0	100.0	65.2	(34.8)	-35%	65.2	100%	0.0	131.5	(131.5)	-100%	(65.2)	-100%
Manufacturing Extension Partnership (MEP)	46.3	110.0	89.6	(20.4)	-19%	43.3	94%	4.0	122.0	(118.0)	-97%	(65.6)	-96%
National Science Foundation													
Research and Related Activities	6429.0	6600.0	6065.0	(535.0)	-8%	(384.0)	-6%	6854.1	7326.0	(471.9)	-6%	769.1	13%
Major Research Instrumentation (MRI)	5131.7	5155.0	4821.0	(315.0)	-6%	(310.7)	-6%	5594.1	5742.3	(148.3)	-3%	773.0	16%
Major Research Instrumentation (MRI)	114.4	119.0	93.9	(25.1)	-18%	(20.6)	-18%	115	123.1	(7.3)	-7%	21.1	22%
Faculty Early Career Development (CAREER)	166.5	166.4	167.8	2.4	1%	11.3	7%	181.9	183.6	(1.7)	-1%	14.1	8%
Research Experiences for Undergraduates (REU)	26.9	61.6	67.7	(6.9)	-6%	0.8	1%	61.6	68.4	(6.8)	-10%	3.9	7%
Experimental Programs to Stimulate Competitive Research (EPSCoR)	107.0	120.0	115.0	(5.0)	-4%	8.0	7%	113.5	133.2	(19.7)	-15%	(11.5)	-1%
Integrative Graduate Education and Research Training	42.4	47.3	37.8	(9.5)	-20%	(4.6)	-11%	38.8	52.5	(13.7)	-26%	1.0	3%
Graduate Research Fellowship (GRF)	8.1	9.0	8.7	(0.9)	-10%	0.0	0%	8.1	10.0	(1.9)	-19%	0.0	0%
Professional Science Master's Degree Program	0.0	10.0	0.0	(10.0)	-100%	0.0	0%	0	12.0	(12.0)	-100%	0.0	0%
Education and Human Resources													
Mathematics and Science Education Partnership (MSEP)	750.6	896.0	725.6	(170.4)	-19%	(25.0)	-3%	790.4	895.0	(104.6)	-21%	64.8	9%
Robert H. Royce Scholarship	46.0	100.0	48.3	(51.7)	-52%	2.5	6%	57	117.0	(60.0)	-54%	2.5	5%
Science, Mathematics, Engineering, and Technology Talent Expansion	10.0	89.8	15.0	(74.8)	-83%	5.0	6%	11.6	115.0	(103.4)	-90%	(3.4)	-23%
Advanced Technological Education	29.7	40.0	39.7	(10.3)	-26%	0.0	0%	29.7	50.0	(20.3)	-41%	0.0	0%
Integrative Graduate Education and Research Training/EPHR (IGERT)	61.6	62.0	61.6	(0.4)	-1%	0.0	0%	61.6	67.7	(6.1)	-11%	0.0	0%
Graduate Research Fellowship (GRF)	25.0	27.1	25.0	(2.1)	-8%	0.0	0%	25	30.1	(5.1)	-17%	0.0	0%
	97.5	96.6	88.1	(8.5)	-9%	(9.4)	-10%	116.7	107.2	(9.5)	-9%	28.6	33%
Major Research Equipment and Facilities													
Agency Operations and Award Management	244.7	245.0	220.7	(24.3)	-10%	(24.0)	-10%	147.5	262.0	(114.5)	-44%	(73.2)	-33%
National Science Board	285.6	285.0	281.8	(3.8)	-1%	(3.8)	-1%	305.1	309.8	(4.7)	-2%	23.3	8%
Inspector General	4.0	4.1	4.0	(0.1)	-2%	(0.0)	0%	4	4.2	(0.2)	-5%	0.0	0%
Laboratory Science Pilot Program (Sec. 702b)	124	12.4	11.4	(6.9)	-56%	11.0	88%	13.1	12.8	0.3	2%	1.7	15%
	0.0	5.0	0.0	(5.0)	-100%	0.0	0%	0	0	0	0%	0.0	0%

FIGURE 1
Funding for PL 110-69, America COMPETES Act
cont'd

[illegible]

FIGURE 2 NASA - FY2008 <i>(dollars in millions)</i>						
Programs	President's FY2008 Request	NASA Auth FY2008	Omnibus Approps	Delta Omnibus/ Authorization	%	Delta Omnibus/ President
NASA						
Science, Aeronautics, and Exploration	10483.1		10543.1			80.0
Science	5516.1		5577.4			61.3
Earth Science	1497.3		1544.1			46.8
HelioPhysics	1057.2		1070.4			13.2
Planetary Science	1395.8		1405.5			9.7
Astrophysics	1565.8		1589.5			33.7
Exploration Systems	3923.8	4357.3	3842.0	(515.3)	-13%	(81.8)
Constellation Systems	3068.0		3030.1			(37.9)
Advanced Capabilities	855.8		840.9			(14.9)
Aeronautics Research	554.0	990.0	625.3	(364.7)	-58%	71.3
Cross-Agency Support	489.2		556.4			67.2
Education Programs	153.7		180.0			26.3
Advanced Business Systems	103.1		83.5			(19.6)
Innovative Partnerships	198.1		180.0			(18.1)
Shared Capabilities	34.3		33.7			(0.6)
Exploration Capabilities	6791.7		6733.7			(58.0)
Space Operations	6791.7	6546.6	6765.7	219.1	3%	(26.0)
Space Shuttle	4007.5		4000.0			(7.5)
International Space Station	2238.6		2220.0			(18.6)
Space and Flight Support	545.7		545.7			0.0
Inspector General	34.6	34.6	32.6	(2.0)	-6%	(2.0)
TOTAL AGENCY	17309.4	18686.3	17309.4	(1376.9)	-8%	0.0

FIGURE 3
NASA - FY2009*
(dollars in millions)

Programs	Omnibus Approps	President's FY2009 Request	Delta President FY09/ Omnibus	%
NASA				
Science	4706.2	4441.5	(264.7)	-6%
<i>Earth Science</i>	<i>1280.3</i>	<i>1367.5</i>	<i>87.2</i>	<i>7%</i>
<i>Planetary Science</i>	<i>1247.5</i>	<i>1334.2</i>	<i>86.7</i>	<i>7%</i>
<i>Astrophysics</i>	<i>1337.5</i>	<i>1162.5</i>	<i>(175.0)</i>	<i>-13%</i>
<i>Heliophysics</i>	<i>840.9</i>	<i>577.3</i>	<i>(263.6)</i>	<i>-31%</i>
Aeronautics	511.7	446.5	(65.2)	-13%
Exploration	3143.1	3500.5	357.4	11%
<i>Constellation Systems</i>	<i>2471.9</i>	<i>3048.2</i>	<i>576.3</i>	<i>23%</i>
<i>Advanced Capabilities</i>	<i>671.1</i>	<i>452.3</i>	<i>(218.8)</i>	<i>-33%</i>
Space Operations	5526.2	5774.7	248.5	4%
<i>Space Shuttle</i>	<i>3266.7</i>	<i>2981.7</i>	<i>(285.0)</i>	<i>-9%</i>
<i>International Space Station</i>	<i>1813.2</i>	<i>2060.2</i>	<i>247.0</i>	<i>14%</i>
<i>Space and Flight Support</i>	<i>446.3</i>	<i>732.8</i>	<i>286.5</i>	<i>64%</i>
Education	146.8	115.6	(31.2)	-21%
Cross-Agency Support	3242.9	3299.9	57.0	2%
Inspector General	32.6	35.5	2.9	9%
TOTAL AGENCY	17309.4	17614.2	304.8	2%

*Account structure for NASA was reorganized in the FY2009 budget request

FIGURE 4
Department of Energy
Applied Technology Programs
(dollars in millions)

[illegible]

FIGURE 4
Department of Energy
Applied Technology Programs
cont'd

[illegible]

1995 World volume was smaller, due to a lack of low-level and low-level control.

[1] Total prize amounts delineated in law, not by fiscal year

(1) Total prize amounts estimated in 1997, not of fiscal year

[2] \$2.5 million total (not by fiscal year) authorized

[3] \$10 million total (not by fiscal year) authorized

[5] \$8 million authorized for FY08-FY14

*To be funded through EERE and Office of Science

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- \$100 million in funding is authorized for the UltraDeep program.

appropriations, although it is listed as "On nibus Appropos")

FIGURE 5 Department of Homeland Security S&T Directorate and DNDO <i>(dollars in millions)</i>						
Programs	President's FY2008 Request	Omnibus Approps	Delta Omnibus/ President FY08	%	President's FY2009 Request	Delta President FY09/ Omnibus
DHS S&T Directorate						
Management and Administration	142.6	138.6	(4.0)	-3%	132.1	(6.5)
Border and Maritime	25.9	25.5	(0.4)	-2%	35.3	9.8
Chemical and Biological	228.9	208.0	(20.9)	-9%	200.4	(7.6)
Command, Control, and Interoperability	63.6	57.0	(6.6)	-10%	62.4	5.4
Explosives	63.7	77.7	14.0	22%	96.1	18.5
Human Factors	12.6	14.2	1.6	13%	12.5	(1.7)
Infrastructure and Geophysical	24.0	64.5	40.5	169%	37.8	(26.7)
Innovation	59.9	33.0	(26.9)	-45%	45.0	12.0
Laboratory Facilities	88.8	103.8	15.0	17%	146.9	43.1
Test, Evaluation, and Standards	25.5	28.5	3.0	12%	24.7	(3.8)
Transition	24.7	30.3	5.6	23%	31.8	1.6
University Programs	38.7	49.3	10.6	27%	43.8	(5.5)
TOTAL	799.1	830.3	31.2	4%	868.8	38.5
DHS Domestic Nuclear Detection Office (DNDO)						
Management and Administration	34.0	31.5	(2.5)	-7%	38.9	7.4
Research, Development, and Operations	319.9	323.5	3.6	1%	334.2	10.7
Systems Acquisition	208.0	129.8	(78.3)	-38%	190.7	61.0
TOTAL	561.9	484.8	(77.2)	-14%	563.8	79.1
						16%

FIGURE 6
Department of Transportation R&D
(Surface Transportation)
(dollars in millions)

	President's FY2008 Request	SAFETEA-LU/ FAA Auth FY2008	Omnibus Approps	Delta Omnibus/ FY2008 Authorization	%	Delta Omnibus/ President	%	President's FY2009 Request	SAFETEA-LU/ FAA Auth FY2009	Delta President/ FY2009 Authorization	%
Department of Transportation (Surface)											
Research and Intelligent Transportation Systems (FHWA)	410.0	429.8	429.8	0.0	0%	19.8	5%	429.8	429.8	0.0	0%
Research and University Research (FTA)	61.0	65.5	65.4	(0.1)	0%	4.4	7%	60	69.8	(9.8)	-14%
Research and Innovative Technology Administration (RITA)	39.0	39.0	39.0	0.0	0%	0.0	0%	39	39.0	0.0	0%
Research & Development	12.0		12.0	12.0	0%	0.0	0%	12	12.0	0.0	0%
Bureau of Transportation Statistics (BTS)	27.0	27.0	27.0	0.0	0%	0.0	0%	27	27.0	0.0	0%
University Transportation Centers		76.7	76.7	0.0	0%			76.7	76.7	0.0	0%

FIGURE 7 National Oceanic and Atmospheric Administration <i>(dollars in millions)</i>							
Programs	President's FY2008 Request	Omnibus Approps	Delta Omnibus/ President	%	President's FY2009 Request	Delta President FY09/ Omnibus	%
NOAA							
National Weather Service	903.5	911.4	7.9	1%	930.7	19.3	2%
Oceanic and Atmospheric Research	368.8	398.0	29.2	8%	382.6	(15.4)	-4%
National Environmental Satellite, Data, and Information Service	978.3	955.1	(23.2)	-2%	1157.9	202.8	21%
Program Support	442.1	420.8	(21.3)	-5%	494.8	74.0	18%
National Ocean Service	468.5	524.5	56.0	12%	476.6	(47.9)	-9%
National Marine Fisheries Service	795.9	710.6	(85.3)	-11%	782.3	71.7	10%
TOTAL NOAA	3957.1	3920.4	(36.7)	-1%	4109.8	189.4	5%

FIGURE 8 Environmental Protection Agency (dollars in millions)							
Programs	President's FY2008 Request	Omnibus Approps	Delta Omnibus/ President	%	President's FY2009 Request	Delta President FY09/ Omnibus	%
EPA							
Science and Technology	754.5	760.0	5.5	1%	763.5	3.5	0%
Environmental Programs & Management	2298.2	2327.9	29.7	1%	2,338	10.5	0%
Inspector General	38.0	41.1	3.1	8%	39.5	(1.6)	-4%
Buildings & Facilities	34.8	34.2	(0.6)	-2%	35	0.8	2%
Oil Spill Response	17.0	17.0	0	0%	17.7	0.7	4%
Superfund Program Funds	1211.4	1216.7	5.7	0%	1230.6	13.9	1%
Superfund S & T	26.1	25.7	(0.4)	-2%	26.4	0.7	3%
Superfund Inspector General	7.1	11.5	4.4	62%	7.2	(4.3)	-37%
Total Superfund	1244.7	1253.9	8.9	1%	1264.2	10.3	1%
Lust	72.5	105.8	34.0	47%	72.3	(33.5)	-32%
State & Tribal Assistance Grants	2744.4	2926.2	181.8	7%	2621.9	(304.3)	-10%
Recission	5.0	5.0	0.0	0%	10	5.0	100%
Total EPA	7199.4	7461.5	262.0	4%	7142.5	(319.0)	-4%

<div> <div>FIGURE 9</div> <div>U.S. Fire Administration</div> <div>(dollars in millions)</div> </div>								
Programs	President's FY2008 Request	FY2008 FIRE Authorization	Omnibus Approps	Delta Omnibus/ President	President's FY2009 Request	FY2009 Authorization	Delta President FY09/ Omnibus	%
US FIRE ADMINISTRATION								
U.S. Fire Administration	43.3	68.8	43.3	0.0	40.9		(2.4)	-6%
Assistance to Firefighter Grants	300.0	1000.0	560.0	260.0	287	1000	(273.0)	-49%
Staffing for Adequate Firefighting and Emergency	0.0	1130.0	190.0	190.0	0	1159	(190.0)	-100%

Bart Gault	Paul Zisk
Ben Chandler	Jimmy V. Costello
x Harry E. Mitchell	x Dwayne Hawley
x Brian B.	x [Signature]
Steve [Signature]	x Lynn Woodsey
x Paul E. Kanyinski	x Paul Sick
x Russ Combs	x Eddie Binn Johnson
x Jim Matheson	Max Leale
Barton P. Hill	x Charles A. Wicks
x Jerry McGray	x Mike Ror
x Charles J. Melson	x Gable Giff
x Rick Lang	John [Signature]

List of Signatures

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Representative Mark Udall
Representative Baron Hill
Representative Charles Wilson
Representative Jerry McNerney
Representative Mike Ross
Representative Charles Melancon
Representative Gabrielle Gifford
Representative Nick Lampson
Representative Laura Richardson

MINORITY VIEWS AND ESTIMATES
COMMITTEE ON SCIENCE AND TECHNOLOGY
FISCAL YEAR 2009 (FY09)

We are mindful that the Nation faces tight budgetary constraints and recognize the difficulty in striking a balance between adequately funding our nation's priorities while at the same time exhibiting fiscal restraint to reduce the deficit. We are in agreement with the Majority that if we are to remain ahead of the global curve with regards to competitiveness and innovation, we must make the appropriate investments in research, development, technology, and math and science education.

We applaud the President for putting forward a budget that reduces the deficit and keeps America on track to double the funding for physical sciences and engineering at the National Science Foundation (NSF), the National Institute of Standards and Technology (KIST), and the Office of Science at the Department of Energy (DOE). Building on the President's American Competitiveness Initiative (ACI) and Republican-led efforts in the last Congress, this committee stepped up to the plate and enacted the *America COMPETES Act* (COMPETES) (P.L. 110-69) last year, authorizing increased levels of funding for these agencies. We were disappointed to see that the Appropriators did not adequately fund these agencies in the FY08 Omnibus (P.L. 110-161). The funding they provided was not only 12 percent below the level that we authorized in COMPETES, it was six percent below the President's FY08 budget request levels. This is simply unacceptable, and a situation we do not want to see again.

Department of Energy (DOE)

We are pleased to see the Office of Science's budget request at an increase of \$700. million over the appropriated FY08 level. We were very disappointed that the Appropriators cut funding to many important programs at the Office of Science in the FY08 Omnibus and hope that the Budget Committee will set full funding levels for these programs in FY09. Programs such as High Energy Physics and projects such as the International Thermonuclear Experimental Reactor (ITER) cannot withstand another round of cut or zeroed out budgets, respectively, without having a detrimental effect on high energy physics and fusion research in the United States and on the reputation of our country as a reliable international partner in scientific research.

We would like to point out that the bulk of the cuts to the Office of Energy Efficiency and Renewable Energy's (SERE) budget request is due to the absence of \$187 million in congressionally directed projects from FY08, \$65 million in the Hydrogen Technology Program and \$224 million in the Weatherization and Intergovernmental Activities program. Of the cuts in the Hydrogen program, \$32 million are due to the transfer of three activities to Vehicle Technologies, and the remaining reduction reflects a deferral of certain R&D to focus on barriers in hydrogen storage and fuel-cell components. According to DOE, the Weatherization program will be refocused to high-return State and local programs, and the funding that would have gone to Weatherization Assistance Program Grants will be used for higher-priority R&D which benefits all Americans. We would also like to point out that the \$12 million in cuts to the Solar Energy program represent the down-selection of industry contracts and the transfer of Solar Heating and Cooling to Buildings Technology.

While we are pleased to see a significant increase in the Geothermal Technology program in FY09, we are disappointed that the Department did not request funding for geothermal energy production from oil and gas fields (co-production) and recovery and production of geopressured resources as provided for in Section 616 of the *Energy Independence and Security Act of 2007* (P.L. 110-140). According to a National Renewable Energy Lab workshop in May of 2006, it is estimated that in the next twenty years, these two resources (co-production and geopressured) could provide as much as 70,000 MW of new power which would approach 10 percent of our total national electric power needs. In addition, substantial supplies of gas could be recovered from geopressured resources.

In all, the FY09 budget request for EERE continues key elements of the Advanced Energy Initiative within the constraints of a tight federal budget.

We would like to echo the disappointment that the Majority has expressed for the Administration's recommendation that the Petroleum Oil Technology and Natural Gas Technologies research and development programs be terminated as well as its recommendation that the Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Research Fund be repealed. In light of the fact that our country relies on fossil fuels for about 85 percent of the energy it consumes, it makes sense

to continue funding R&D programs that will help us become more dependent on domestic sources of oil and gas rather than on foreign sources.

A majority of us are in disagreement with the Majority views on the establishment of an Advanced Research Projects Agency for Energy (ARPA-E). We do not feel that creating a new agency to do work that is currently being done at the Department of Energy is a justified use of the limited funds available to the department and we support the department's decision to not establish ARPA-E, but to engage in ARPA-E-type projects within the current DOE structure.

National Aeronautics and Space Administration (NASA)

The Committee has sought to enable NASA to succeed as a multi-mission agency in carrying out the goals expressed in the President's *Vision for Space Exploration* and the *NASA Authorization Act of 2005* (P.L. 109-155). The Committee has remained supportive in the ensuing years, but has grown increasingly concerned as NASA's requests have repeatedly been below spending profiles originally proposed when the vision was introduced. As a result, we share many of the views expressed by the Majority.

We are concerned that the current FY09 budget request of \$17.6 billion fails to even keep pace with inflation and further jeopardizes NASA's ability to successfully accomplish its portfolio of missions. We are especially concerned about the threat this request poses to manned space flight capabilities. From FY05 thru FY10, NASA estimates that the agency will be forced to absorb \$2.7 billion in costs for returning the Space Shuttle to flight following the *Columbia* accident, and an additional \$2.4 billion of previously unanticipated costs to retire the Space Shuttle. This has contributed to delays in the development of a Shuttle replacement as well as cuts in important exploration-related research to offset these costs.

According to the FY09 budget request, March 2015 is the earliest date NASA has committed for delivery of the Crew Exploration Vehicle and its Ares 1 launcher. This date has slipped as a result of past under-funding. We are very concerned that once the Shuttle is retired in 2010, the United States will find itself entirely reliant on other nations for as long as five years, to access our multi-billion dollar Space Station. Furthermore, NASA is now faced with the task of asking Congress for further exceptions from the *Iran, North Korea and Syria Non-Proliferation Act*, so it can continue to purchase Russian cargo and Soyuz flights at a cost of nearly \$2 billion for hardware and services. We would rather see these funds used to purchase similar capabilities from American aerospace companies. Failure to enact an exception to this Act will leave the United States without any capability to utilize the Space Station. Furthermore, this impending, and widening, gap in the transition from the Shuttle to the Constellation poses a significant threat to the highly skilled aerospace workforce similar in magnitude to the loss that accompanied the transition from the Apollo program to the Space Shuttle. This is an unfortunate situation.

We applaud recent efforts by NASA to initiate a new series of science missions. It is imperative that the cadence of missions be improved to keep the science community fully engaged and to sustain the pipeline of future scientists and engineers. We are especially pleased to note NASA's budget proposes to initiate missions recommended by the recently completed decadal survey on Earth Science and applications.

NASA's Aeronautics enterprise is by far the Federal Government's largest program supporting civil aeronautics R&D. It has been subject to a number of reductions and reorganizations over the last decade, resulting in a budget that is today a fraction of its funding level compared to the late 1990s. NASA and our country simply cannot afford to absorb more cuts to Aeronautics research at the risk of completely ceding this important source of technological and industrial advantage.

Our government is now in the early stages of designing and developing a successor to the Nation's current, outmoded air traffic control system. Many of the new technologies that will enable this system—called NextGen—are under development within NASA's Aeronautics program. At a minimum, the President's FY09 budget request for aeronautics must be fully met. Otherwise, we are at risk of long-term congestion in our national airspace system.

We agree with the Majority on the importance of NASA's space and aeronautics programs. We also recognize the importance of global leadership in space and aeronautics if we are to maintain our national security, expand our economy, and advance our technological base. NASA has been asked to do too much with too little. The Committee believes that NASA will be unable to carry out the goals laid out in the President's Vision and by Congress without additional funding in FY09.

National Science Foundation (NSF)

In keeping with the plan outlined in the ACI to double funding for research at NSF over the next 10 years, the FY09 budget request for NSF is \$6.9 billion, an increase of 13.6 percent, or \$822 million over the FY08 Omnibus. We are pleased to see the increases spread across all of the research fields NSF supports.

Within the Education and Human Resources account, we agree with the Majority that the Robert Noyce Scholarship program, which we expanded in COMPETES, and the Math and Science Partnership program are not adequately funded in the FY09 request. However, we maintain that many of the FY09 authorized amounts remain too high and encourage the Budget Committee to consider setting increased funding levels for these programs to meet the goals in COMPETES, but in a fiscally responsible manner.

While COMPETES accelerates the path of doubling funding for NSF over a seven-year period, most of our Members remain committed to the 10-year doubling path established in the House-passed version of COMPETES and supported by the President.

Department of Commerce—National Institute of Standards and Technology (NIST)

We strongly support the President's request of \$535 million for NIST's Scientific, Technical, and Research Services (STRS) account, which is \$94 million or 21 percent more than the FY08 enacted level of \$441 million. This increase reflects the priorities laid out in the President's ACI and overwhelmingly supported by both Chambers of Congress in COMPETES. However, we object to the President's FY09 request to discontinue the Manufacturing Extension Partnership (MEP) and Technology Innovation Program (TIP). NIST's laboratory and extramural activities directly support our nation's international competitiveness and economic well-being and should be funded in accordance with the levels agreed to in COMPETES.

Department of Commerce—National Oceanic and Atmospheric Administration (NOAA)

We support the FY09 budget request for NOAA of \$4.1 billion, a \$203 million (5.2 percent) increase over the FY08 enacted level. We believe this request reflects the importance of the products and services NOAA provides.

We believe that the request for the National Weather Service (NWS) of \$930.7 million, a 2.1 percent increase over the FY08 enacted level, is an appropriate level to allow for NWS to invest in new forecasting technology while maintaining the high standard for weather products and services they provide. This includes \$4.3 million for operating and maintaining the 12 existing and three soon-to-be-deployed hurricane buoys, a critical "front line" technology that provides critical information on cyclone formation, locations, and intensity. The FY09 budget request includes a new request of \$5.7 million for the NOAA All Hazards Weather Radio Improvement Project (WRIP), to update obsolete technologies and prevent national weather radio blackouts. The Department of Homeland Security views the All Hazards Weather Radio as part of the National Alert System.

We agree with the Majority regarding support for FY09 request for \$74 million for the National Environmental Satellite Data and Information Service (NESDIS) for the acquisition of key climate sensors for National Polar-Orbiting Operational Satellite System (NPOESS). We were very disappointed that Appropriators cut \$25 million from the individual Commerce, Justice, State Appropriations bills passed in both the House and the Senate that was for climate sensor acquisition when the FY08 Omnibus was put together.

We believe that the Operations, Research and Facilities (ORF) account of NESDIS is completely adequate for NOAA to conduct data analysis, processing, management, and archiving. The decrease in the FY09 funding request for ORF is due to the absence of \$25.8 million in congressionally directed projects from FY08.

We agree with the Majority views that there are still significant concerns with the progress of the NPOESS program, and we will continue to closely follow its advances. The funding request level in the FY09 budget will satisfy the needs of this program to continue with satellite procurements. Furthermore, we were pleased by the Administration's recognition that there is a natural ebb and flow in the level of necessary funding for satellite programs as it goes through its development, procurement, and operational phases and that the greater level of funding expected to be requested in future years is entirely appropriate to the nature of satellite technology, procurements.

We are pleased to join the Majority in their support of the significant increase of \$242 million for the Geostationary Operational Environmental Satellite (GOES—

R) program. NOAA is ready to begin awarding contracts for the individual instruments that will be integrated into this satellite, and we feel that the request level is entirely appropriate at this phase of the GOES-R program development.

We disagree with the Majority views that the request of \$383 million for the Office of Ocean and Atmospheric Research (OAR) is inadequate to support the future needs of NOAA. The reduction of requested funds for FY09 from the FY08 enacted is in large part due to the absence of congressionally directed projects.

Department of Homeland Security (DHS)

We are pleased to see that the FY09 budget request includes \$868.8 million dollars for the Science and Technology Directorate (S&T), an increase of 4.6 percent from FY08 levels. The increased funding will primarily go to support new, high-priority laboratories: initial operations at the National Biodefense Analysis and Countermeasures Center (NBACC) and construction on the National Bio- and Agro Defense Facility (NBAF). However, we continue to be concerned that the distribution of funding within S&T is heavily weighted towards specific hazards that are based primarily on programmatic inertia. We welcome increases in the FY09 request to some overlooked divisions, particularly the Border/Maritime division, but believe S&T should continue to adjust its funding in support of effective, efficient, and evolving defenses across the hazards spectrum.

The FY09 budget request includes \$561.9 million for the Domestic Nuclear Detection Office (DNDO), an increase of \$81 million or 16.8 percent from enacted FY08 levels. We are supportive of the research activities of DNDO in the Exploratory Research Project and Academic Research Initiative, but concerned that the requested increase would primarily fund procurement and deployment of 120 Advanced Spectroscopic Portal (ASP) systems. The ASP program is currently under review by DHS and GAO and pursuant to the *2007 Homeland Appropriations Act* will require certification by the Secretary before procurement may begin. Therefore, we urge caution before committing to large procurements for this program.

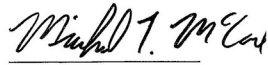
Federal Aviation Administration (FAA)—Research and Development


We support the Administration's budget request for FAA Research and Development. The FAA R&D enterprise has, over the years, produced technologies enabling a much safer and more efficient national air transportation system. Despite these efforts, however, traffic has grown at a much faster rate. For FY09, FAA has requested a budget increase coinciding with efforts related to NextGen. As FAA endeavors to operate its current air traffic control system, and at the same time incorporating NextGen-related technologies, it is vitally important that their budget request be fully funded.

United States Fire Administration (USFA)

The FY09 budget request includes \$40.9 million for the USFA, a decrease of \$2 million from FY08 enacted levels and nearly \$30 million below the authorized level. The mission of USFA is to "reduce life and economic losses due to fire and related emergencies, through leadership, advocacy, coordination and support." This organization provides vital assistance in the areas of training, fire education and awareness, and oversees grants to a number of local fire departments across the country. These activities have made a substantial impact over the last 30 years. The Committee recently passed a reauthorization bill for USFA that we believe accurately reflects the programmatic needs of the agency. We urge funding at the full \$70 million request and the continuation of USFA as a separate line item within the budget for the Federal Emergency Management Agency (FEMA).


The Honorable Ralph Hall


The Honorable Michael McCaul


The Honorable Phil Gingrey


The Honorable Brian Bilbray



The Honorable Bob Inglis


The Honorable Mario Diaz-Balart


The Honorable Tom Feeney


The Honorable Randy Neugebauer


The Honorable Adrian Smith


The Honorable W. Todd Akin


The Honorable Roscoe Bartlett



The Honorable James Sensenbrenner


The Honorable Frank Lucas


The Honorable Vernon Ehlers


The Honorable David Reichert


The Honorable Judy Biggert



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CHAIR, 107th CONGRESS



Eddie Bernice Johnson
Congress of the United States
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ADDITIONAL VIEWS COMMITTEE ON SCIENCE AND TECHNOLOGY FISCAL YEAR 2009

In addition to the Views and Estimates provided by the Committee on Science and Technology, I strongly recommend that several programs to Broaden Participation receive funding at least to keep up with inflation. In addition, I request full funding for several programs authorized by the America COMPETES Act.

I would like the following programs at National Science Foundation to receive, at least, the following budget authorizations listed. The "Plus-up" amount represents how much should be ADDED to the President's FY09 budget request. Rationale is provided below.

Program	Plus-up from FY09 request	Note	
America COMPETES Diversity Programs - underfunded			
NSF: Science, Technology, Engineering and Math Talent Expansion Program (STEP)	\$20,300,000	\$50,000,000	total in COMPETES
NSF: Advanced Technology Education (ATE)	\$6,080,000	\$57,700,000	total in COMPETES
NSF: Experimental Program to Stimulate Competitive Research (EPSCoR)	\$5,691,203	\$133,200,000	total in COMPETES
NSF: Partnerships for Access to Laboratory Science-- Sec 7026 of COMPETES Act	\$5,000,000	\$5,000,000	total in COMPETES
NSF: Hispanic-serving Institutions Undergraduate Program-- Sec 7033 of COMPETES Act	\$5,000,000	n/a	no amount specified in COMPETES
NSF: Faculty Early Career Development (CAREER) Program	\$1,690,000	\$183,600,000	total in COMPETES
DOE: Summer Institutes-- Sec 3185 of COMPETES Act	\$20,000,000	\$20,000,000	total in COMPETES
DOE: Outreach and Experiential-based Programs for Minority Students-- Sec 3135 of COMPETES Act	\$7,500,000	\$7,500,000	total in COMPETES

E.B. Johnson - Additional Views 1

Other Diversity Programs - underfunded			
Informal Science Education (ISE)	\$1,493,202	\$67,493,202	<i>total inflation-adjusted level funding</i>
ADVANCE Women's Program	\$1,051,050	\$21,841,050	<i>total inflation-adjusted level funding (based on FY08)</i>
Broadening Participation in Computing (BPC)	\$284,108	\$14,284,108	<i>total inflation-adjusted level funding</i>
Graduate Research Fellowships - Women in Engineering and Computer Science	\$533,691	\$8,593,691	<i>total inflation-adjusted level funding</i>
Opportunities to Enhance Diversity in the Geosciences (OEDG)	\$256,386	\$4,856,386	<i>total inflation-adjusted level funding</i>
Minority Post-Docs	\$601,239	\$4,001,239	<i>total inflation-adjusted level funding</i>
Graduate Research Diversity (GRD) - ENG	\$17,250	\$76,725	<i>total inflation-adjusted level funding (based on FY08)</i>
Significant Opportunities in Atmospheric Research and Science (SOARS) - GEO	\$28,425	\$538,425	<i>total inflation-adjusted level funding</i>

Explanation of Function 250 Science Requests FY2009

America COMPETES Diversity Programs - underfunded

The following programs were authorized in the America COMPETES Act, H.R. 2272, signed into law on August 9, 2007. They are under-funded by the Administration's budget and should receive full funding, as recommended by the authorizing committees.

NSF: Science, Technology, Engineering and Math Talent Expansion Program (STEP)

NSF: Advanced Technology Education (ATE)

NSF: Experimental Program to Stimulate Competitive Research (EPSCoR)

NSF: Partnerships for Access to Laboratory Science-- Sec 7026 of COMPETES Act

NSF: Hispanic-serving Institutions Undergraduate Program-- Sec 7033 of COMPETES Act

NSF: Faculty Early Career Development (CAREER) Program

DOE: Summer Institutes-- Sec 3185 of COMPETES Act

DOE: Outreach and Experiential-based Programs for Minority Students-- Sec 3135 of COMPETES Act

Science, Technology, Engineering and Math Talent

Expansion Program (STEP)

The Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP) seeks to increase the number of students receiving associate or baccalaureate degrees in established or emerging STEM fields. Broadening participation of ethnic minorities is key in funding decisions for STEP. *Full funding of the \$50 million authorization is recommended.*

Advanced Technology Education (ATE)

With an emphasis on two-year colleges, the Advanced Technological Education (ATE) program focuses on the education of technicians for the high-technology fields. It involves partnerships between academic institutions and employers to improve STEM education at the undergraduate and secondary school levels. *Full funding of the \$57.7 million authorization is recommended.*

Experimental Program to Stimulate Competitive Research (EPSCoR)

The mission of EPSCoR grant program is to avoid undue geographical concentration of science research and education. Unique goals are to activate effective jurisdictional and regional collaborations among academic, government and private sector stakeholders that advance scientific research, promote innovation and provide multiple societal benefits. *Full funding of the \$133.2 million authorization is recommended.*

NSF: 'Partnerships for Access to Laboratory Science (PALS)—

Sec 7026 of COMPETES Act

The pilot program will foster partnerships between high-need high schools, universities, and industry to fund grants for the improvement of laboratory equipment, materials, curricula and teacher training. It was created in the America COMPETES Act, Section 7026. *Full funding of the \$5 million authorization is recommended.*

NSF: Hispanic-serving Institutions Undergraduate Program—

Sec 7033 of COMPETES Act

This is a competitive grant program to enhance STEM education at Hispanic-Serving Institutions and to increase the retention and graduation rates of students pursuing associates or baccalaureate degrees in STEM. *Funding of \$5 million is recommended.*

NSF: Faculty Early Career Development (CAREER) Program

A new research grant program awards funds to early-career scientists. Minority researchers sometimes leave STEM careers because of the great difficulty in obtaining research grant funding during their pivotal early career years. Based on recommendations by the National Academies' *Rising Above the Gathering Storm* report, the program was created to strengthen the pipeline. *Full funding of the \$183.6 million authorization is recommended.*

DOE: Summer Institutes-- Sec 3185 of COMPETES Act t

Two-week program hosted by Department of Energy-sponsored National Laboratory that provides hands-on science, technology, engineering, or mathematics laboratory experience for not less than 2 days. The program is for K-12 teachers and provides training to teachers from high-need school districts. It specifies the inclusion of women and minorities. *Full funding of the \$20 million authorization is recommended.*

DOE: Outreach and Experiential-based Programs for Minority Students— Sec 3135 of COMPETES Act

This is an internship program for low-income students to promote experience-based learning opportunities during the summer. The program is targeted toward minority students and is intended to provide hands-on learning experiences at a National Laboratory or elsewhere within the Department of Energy. *Full funding of the \$7.5 million authorization is recommended.*

Other Diversity Programs - underfunded

The following programs are already in existence but are requested by the Administration for decreases, flat funding, or increases that are below the rate of inflation. In most cases, the suggested figure was calculated beginning with the FY07 *actual outlay*, reported by NSF, adding annual inflation rates of 3.2% for FY08 and 2.3% for FY09 (predicted). This strategy for calculating "flat-funding," or inflation-adjusted dollars, was devised in consultation with the House Committee on Budget.

Informal Science Education (ISE)

ADVANCE Women's Program

Broadening Participation in Computing (BPC)

Graduate Research Fellowships - Women in Engineering and Computer Science

Opportunities to Enhance Diversity in the Geosciences (OEDG)

Minority Post-Docs

Graduate Research Diversity (GRD) - ENG

Significant Opportunities in Atmospheric Research and Science (SOARS) - GEO

Informal Science Education (ISE)

The ISE program invests in projects that develop and implement informal learning experiences to increase interest, engagement, and understanding of science by individuals of all ages and backgrounds. Projects may target either public audiences or professionals whose work directly affects informal STEM learning and demonstrate strategic impact, innovation, and collaboration. *At least "flat funding" in inflation-adjusted dollars in the amount of \$67,493,202 is recommended.*

ADVANCE

The goal of the ADVANCE program is to develop systemic approaches to increase the representation and advancement of women in academic science and engineering careers. Proposals that address the participation and advancement of women with disabilities and of women from underrepresented minority groups are encouraged. *At least "flat funding" in inflation-adjusted dollars calculated from the FY08 estimate in the amount of \$21,841,050 is recommended.*

Broadening Participation in Computing (BPC)

The Broadening Participation in Computing (BPC) program aims to significantly increase the number of U.S. citizens and permanent residents receiving post secondary degrees in the computing disciplines, with an emphasis on students from communities with longstanding underrepresentation in computing: women, persons with disabilities, and minorities. The BPC program also aims to develop effective strategies for

encouraging individuals to pursue academic careers in computing and become role models. *At least "flat funding" in inflation-adjusted dollars in the amount of \$14,284,108 is recommended.*

Graduate Research Fellowship – Women In Engineering and Computer Science

NSF offers approximately 1,000 graduate fellowships for women in this competition. The Graduate Research Fellowship provides three years of support for graduate study leading to research-based masters or doctoral degrees and is intended for students who are at the early stages of their graduate study. *At least "flat funding" in inflation-adjusted dollars in the amount of \$8,593,691 is recommended.*

Opportunities to Enhance Diversity in the GeoSciences

The program supports activities that will lead to an effective program for diversity in the geosciences. It focuses on increasing research opportunities for both undergraduate and graduate students from underrepresented groups, and enhancing infrastructure for institutions that serve minority populations. Collaborations are encouraged between research institutions and minority serving institutions as well as two and four year colleges with large minority populations. *At least "flat funding" in inflation-adjusted dollars in the amount of \$4,856,386 is recommended.*

Minority Post-Docs

The Directorate for Biological Sciences (BIO) and the Directorate for Social, Behavioral and Economic Sciences (SBE) offer Minority Postdoctoral Research Fellowships and related supporting activities in an effort to increase the participation of underrepresented groups in selected areas of science. These fellowships support training and research in STEM fields in a host institution only in the areas of biology and social, behavioral, and economic sciences within the purview of NSF. *At least "flat funding" in inflation-adjusted dollars in the amount of \$4,001,239 is recommended.*

Graduate Research Diversity

NSF awards three-year Graduate Research Fellowships for doctoral candidates in STEM. Within the engineering fellowships, this program reflects the continuing effort by the Directorate for Engineering to promote increased participation of new Ph.D. students in all fields of engineering research with particular emphasis on individuals from underrepresented groups. *At least "flat funding" in inflation-adjusted dollars calculated from the FY08 estimate in the amount of \$76,725 is recommended.*

Significant Opportunities in Atmospheric Science (SOARS)

The mission of SOARS® is to broaden participation in the atmospheric and related sciences by engaging students from groups historically underrepresented in science and preparing them to succeed in graduate school. *At least "flat funding" in inflation-adjusted dollars in the amount of \$538,425 is recommended.*

In summary, these items at the National Science Foundation and Department of Energy are key to our national competitiveness and to promoting diversity in our STEM workforce. NSF has a record of strong performance, and as a senior member of the Committee on Science and Technology, I will continue to advocate for appropriate authorization increases in programs important to diversifying our science and technology workforce. Thank you for considering my requests.

Sincerely,


Eddie Bernice Johnson
Member of Congress

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UNITED STATES
HOUSE OF REPRESENTATIVES

Additional Views and Estimates
Committee on Science and Technology
Fiscal Year 2009 (FY09)

COMMITTEES:
ARMED SERVICES
SUBCOMMITTEES:
RANKING MEMBER
SEAPOWER AND EXPEDITIONARY FORCES
OVERSIGHT AND INVESTIGATIONS

SCIENCE AND TECHNOLOGY
SUBCOMMITTEES:
ENERGY AND ENVIRONMENT
RESEARCH AND SCIENCE EDUCATION

SMALL BUSINESS
SUBCOMMITTEES:
CONTRACTING AND TECHNOLOGY
URBAN AND RURAL ENTREPRENEURSHIP

I am very pleased by the high level of agreement among my colleagues on the Committee on Science and Technology concerning the President's proposed FY 2009 budget proposal released on February 4, 2008. I am proud of our committee's tradition of bipartisan collaboration. We are united in our agreement that if we are to remain ahead of the global curve with regards to competitiveness and innovation, we must place a high priority on making investments in research, development, technology, and math and science education. That said, with a key exception that I will discuss in more detail below, I concur with the Minority Views and Estimates.

With respect to one program under the jurisdiction of the Subcommittee on Energy and Environment on which I serve, I concur with the majority's Committee Views and Estimates concerning funding for the Advanced Research Projects Agency for Energy (ARPA-E) at the Department of Energy.

The dangerous truth is that America is losing economic influence and diplomatic leverage because since 1973, we have not changed our dependence upon oil for 98 percent of energy used for transportation. From reliance upon 30% imported oil and gas in 1974, Americans have grown dependent upon imported oil and gas for 60% of what we consume. The U.S. is the world's #1 importer of oil. China is #2. More than ever, Americans are at the mercy of world events.

Two Congressional studies by the Government Accountability Office in 2007 called for dramatic changes in energy policies to conserve oil, and diversify America's energy sources by developing and deploying advanced energy technologies. Former Chairman Sherwood Boehlert and I requested, "Crude Oil: Uncertainty about Future Oil Supply Makes it Important to Develop a Strategy for Addressing a Peak and Decline in Oil Production" (GAO-07-283). Our current Chairman Bart Gordon requested, "Challenges for Developing and Deploying Alternative Energy Sources for the Future," (GAO-07-106.) These GAO reports provided further validation for the findings and recommendations of the National Academies' report, "Rising Above the Gathering Storm." That report called for dramatic changes in American energy policies, and in particular the establishment of an ARPA-E.

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The International Energy Agency (IEA) and our own Energy Information Administration (EIA) have both documented that world oil production has been virtually unchanged at a plateau during the last 30 months. Meanwhile, demand has steadily increased led by developing countries, such as India and China. Thus, it is an application of the economic laws of supply and demand that explain why oil prices have increased three times to over \$100/barrel (bbl) since 2004.

On January 22, 2008, Jeroen van der Veer, Chief Executive of Shell Oil wrote a "Shell Energy Scenarios" letter and column distributed worldwide that didn't use the word peak oil. However, he warned, "We are experiencing a step-change in the growth rate of energy demand due to population growth and economic development, and Shell estimates that after 2015 supplies of easy-to-access oil and gas will no longer keep up with demand. As a result, society has no choice but to add other sources of energy."

Just yesterday, on February 27, 2008, Deutsche Bank issued a report, "The 100mb/d peak oil market." The report noted that two leading executives of major independent oil companies, the CEO's of France's TOTAL and ConocoPhillips have warned that peak oil is imminent for all practical purposes. Concurring with Mr. van de Veer, the report said, "We can easily see oil demand exceeding 100mb/d by 2015...but why is 100mb/d supply so hard? Simple, it's the declines. Even with today's 5% decline rate, to sustain a 100mb/d oil market will require some 8mb/d of new annual supply growth, *a level that has never been achieved.*" [emphasis mine] The report concluded that oil prices might rise to a level of \$150 bbl by 2010 – not adjusted for inflation – before demand destruction could reduce them. Demand destruction is an economic euphemism for a recession. As this Deutsche report and many other economic experts warn, the U.S. is already hovering on the brink of a recession with oil at \$90-\$100 bbl.

I am a scientist and engineer with 20 years of experience working on research and development programs by the Defense Department and 15 years serving in the Congress reviewing federal government research and development programs. Based upon these experiences, I believe that ARPA-E is needed to perform high-risk, high-reward research and development of advanced energy technologies based upon the successful organizational model of the Defense Advanced Research Projects Agency (DARPA). I concur with the majority Committee's Views and Estimates and recommend funding of ARPA-E at the authorized level of \$300 million in FY 09.



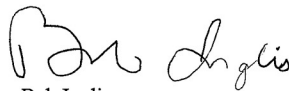
Roscoe G. Bartlett

Additional Views and Estimates (FY 2009)

I agree with the priorities expressed in these views and estimates, and concur with the statements of both the Majority and the Minority regarding our pressing need to increase investments in our nation's science initiatives. The American innovation and ingenuity has placed us a global leader in research and development, and if we are to remain there, our commitment to our scientists, engineers, researchers and students must not waver.

Over the past five years, the President's budget has steadfastly supported hydrogen research and development within the Department of Energy. I am disappointed to find that this year's budget reflects a departure from that trend, and strongly desire that our national commitment not falter in the development of hydrogen energy and transportation technologies. These efforts promise a great payoff for clean and abundant renewable energy, job creation, and climate benefits – payoffs that will be well worth our federal investment and support.

I support the Minority views that we need to ensure that ongoing basic and applied research at the National Science Foundation (NSF), the National Institute of Standards and Technology (NIST), and the Office of Science at the Department of Energy (DOE), does not suffer from any future decreases. Beyond funding these vital science agencies, I see value in contributing resources to efforts to overcome current hurdles in moving breakthrough technologies from the laboratories to the marketplace. For this reason, I support the creation of an Advanced Research Projects Agency for Energy (ARPA-E).



Bob Inglis
Member of Congress

HOUSE SCIENCE AND TECHNOLOGY COMMITTEE

SUMMARY OF OVERSIGHT ACTIVITIES—110TH CONGRESS

Rule X, clause 2(d) of the Rules of the U.S. House of Representatives requires each standing Committee to adopt an oversight plan for the two-year period of the Congress and to submit the plan to the Committees on Oversight and Government Reform and House Administration not later than February 15 of the first session of the Congress.

Part A of this section includes the Oversight Plan of the Committee on Science and Technology for the 110th Congress, which the Committee considered and adopted on February 14, 2007.

Part B of this section contains a summary of the actions taken to implement the Oversight Plan, as well as additional oversight activities undertaken by the Committee.

Part A—OVERSIGHT AGENDA FOR THE 110TH CONGRESS

Rule X, clause 2(d) of the Rules of the U.S. House of Representatives requires each standing Committee to adopt an oversight plan for the two-year period of the Congress and to submit the plan to the Committees on Oversight and Government Reform and House Administration not later than February 15 of the first session of the Congress.

This is the oversight plan of the Committee on Science and Technology for the 110th Congress. It includes the areas in which the Committee expects to conduct oversight during the 110th Congress, but does not preclude oversight or investigation of additional matters as the need arises and as provided for under House Rule XI, clause (b)(1). The Committee is listing items by Subcommittee, but many of the issues and matters will cross Subcommittee jurisdictions and may be reviewed by the Full Committee.

Oversight: Investigations and Oversight Subcommittee

Science Integrity Issues: The Committee will continue to collect and examine allegations of intimidation of science specialists in federal agencies or suppression or revisions of scientific findings because of political or other pressures.

OIRA Guidance of Agency Science: The Committee will study the role of the Office of Information and Regulatory Affairs (OIRA) of the Office of Management and Budget as it reviews proposed rules, guidance documents or other actions by federal agencies.

Weather satellite modernization: The Committee will continue oversight on the troubled National Polar-Orbiting Operational Environmental Satellite System and the Geostationary Operational Environmental Satellite replacement program at the National Oceanic and Atmospheric Administration (NOAA).

Voting system design and integrity: Because of problems in the 2006 election cycle, many states are mandating changes in their voting systems. The Committee will examine issues in its jurisdiction under the *Help America Vote Act of 2002*, including the role of the National Institute of Technology (NIST) as technical specialists for the Election Assistance Commission.

Contracting Management: Many of the problems the Committee encounters in operations at the agencies under its jurisdiction trace back to poor handling of the contracts by which the private sector assists the Government in achieving national goals. The Government Accountability Office (GAO) has continually cited the National Aeronautics and Space Administration (NASA) and the Department of Energy (DOE) as deficient in protecting the public's interests in their activities. The Committee will continue its oversight of contracting at these and other agencies.

Asset Management: In concert with the above, the Committee will also examine how well the agencies control and use the physical assets—equipment and facilities—paid for with taxpayer support. GAO has also reported regularly on agency weaknesses in these areas, putting billions of tax dollars at potential risk.

Oversight: Space and Aeronautics Subcommittee

The Committee has oversight responsibility for the National Aeronautics and Space Administration (NASA), the Federal Aviation Administration's (FAA) research and development programs, FAA's Office of Commercial Space Transportation, and the Department of Commerce's Office of Space Commercialization. NASA is the largest agency under the Committee's jurisdiction, measured by budget. It also has the highest public profile. The agency continues its recovery from the tragic

loss of the crew of Space Shuttle *Columbia* in February 2003, having flown three Shuttle flights in support of International Space Station (ISS) construction since returning the Shuttle to flight status.

Program and Funding Balance Between Space Science and Human Space Flight: With the announcement of the Vision for Space Exploration in January 2004, the President defined new goals for the Nation's human space flight program: use the Space Shuttle to complete construction of the ISS before the Shuttle's retirement in 2010 and initiate development of replacement launch and crew transport capabilities to support human missions to the Moon and Mars. While Congress endorsed those goals in the *National Aeronautics and Space Authorization Act of 2005*, it also made clear in the Act that it expected NASA to carry out a balanced set of activities in human space flight, aeronautics, and science. That is, achievement of NASA's exploration initiative goals should not be funded by sacrificing equally important goals in science and aeronautics. Despite that congressional direction, however, NASA's budget plans have been inadequate to accomplish all of these goals, and the NASA Administrator has assigned a higher priority to the agency's human space flight programs. The Committee will devote significant time to an examination of the implications of NASA's plans and priorities and the resource requirements of a balanced, robust, and beneficial space and aeronautics program at NASA.

Lunar Program Risk: As the first steps in its human exploration initiative, NASA has initiated the *Orion* crew exploration vehicle (CEV) and *Ares* crew launch vehicle (CLV) development programs. The schedule for these programs assumes operational flights by 2014. The agency has also announced its plan to develop a lunar base after the initial lunar landings. Lunar missions will require the development of a heavy-lift cargo-carrying launch vehicle, a lunar lander vehicle, and lunar surface infrastructure, as well as supporting communications and navigation capabilities. The Committee intends to examine the rationale and objectives of the lunar program as well as the key programmatic risks facing the initiative.

Workforce Transition Issues: As the Space Shuttle is retired, and the new CEV program scales up, there is the potential for major workforce transition issues. With the current schedule of Shuttle retirement in 2010 and CEV/CLV deployment in 2014, there will be a four year gap between those programs that will have implications for the workforce. In addition, it will be important to ensure that the skilled workforce needed to safely and successfully fly out the remaining Shuttle missions will be retained until the Shuttle's retirement.

Contract, Financial and Program Management Challenges: The scope of the lunar initiative, coupled with the likely funding constraints, will put a premium on effective program management, as will also be the case for NASA's science programs. The Government Accountability Office (GAO) has identified NASA contract management as a "high-risk" concern since it began issuing such designations in 1990. In addition, the infrastructure for managing NASA's financial activities has been undergoing a long and painful upgrade. GAO has regularly stated it has seen little evidence that the new system allows NASA managers to control cost and schedule issues more effectively than in the past. The Committee intends to maintain a close and continuing watch on these management issues to ensure that NASA's programs are carried out as effectively as possible.

Earth Science Continuity: NASA's science programs will also be an important oversight area for the Committee. Approximately \$4 billion has been removed from the five-year funding plan for NASA's science programs over the last two years, resulting in a predictable disruption to planned science missions and activities. The Committee will examine the impact of those programmatic changes on the outlook for realizing NASA's current and future scientific objectives. In addition, with the release of the National Academies' Decadal Survey of Earth Science and Applications, the Committee intends to examine the recommendations of the Survey and the consistency of NASA's Earth Science and Applications plans and budgets with those recommendations.

International Space Station: The plans for utilization of the ISS by the United States following its completion will be another oversight topic. Given the significant national investment to date in the facility, Congress has directed that NASA maintain a strong research and technology program to take advantage of ISS's unique capabilities. In addition, NASA has stated its intention to utilize the ISS to support its exploration initiative. However, NASA has made significant cuts to the programs for utilizing the ISS, virtually eliminating entire areas of life and microgravity research for the foreseeable future. In addition, the impending retirement of the Space Shuttle raises questions about how NASA will support the utilization and operation of the ISS post-2010, even as NASA seeks commercial operators to undertake some portion of ISS logistical support.

Aeronautics R&D: Another important area for oversight will be NASA's aeronautics program. The aeronautics program has been restructured over the past year, and the Administration's FY07 budget request would result in a 32 percent decline in NASA's aeronautics budget over the years FY04–07. The Committee plans to examine the impact of that restructuring and funding approach on NASA's ability to support the interagency effort to modernize the Nation's air traffic management system, as well as on its ability to undertake important R&D on aircraft safety, emissions, noise, and energy consumption—R&D that will have a big impact on the quality of life and U.S. competitiveness in aviation.

FAA R&D: Committee jurisdiction also extends to the FAA's research and development programs. FAA's authorization expires in 2007, and the Committee will work to reauthorize FAA's R&D programs. The Committee has a particular interest in the performance of the interagency Joint Planning and Development Office (JPDO), which is responsible for planning and coordinating the initiative to develop the Nation's next generation air transportation system (NGATS). The NGATS initiative has a host of issues associated with it, and the Committee plans a number of oversight activities to examine its status.

FAA Commercial Space Transportation: FAA's Office of Commercial Space Transportation (OCST) licenses commercial launch vehicles. An area of increasing interest is the emergence of a number of fledgling commercial human space flight ventures. In addition to its oversight of the FAA's OCST, the Committee will examine the progress of the emerging personal space flight industry as well as the challenges facing it.

Oversight: Technology and Innovation Subcommittee

Commerce Department technology programs: The Committee will conduct program oversight for the National Institute of Standards and Technology (NIST) and other programs assigned to the Technology Administration of the Department of Commerce.

American economic competitiveness: The Nation faces a challenge for economic and technological preeminence. The Committee will evaluate appropriate responses based on the recent National Academies' report, *Rising Above the Gathering Storm*, and other advice.

Technology transfer: The Committee will seek recommendations for continued improvements in the technology transfer incentives built into law by the Bayh-Dole and Stevenson-Wydler Acts and the Small Business Innovation Research program.

Cyber security: During debate on the creation of the Department of Homeland Security, the Committee stressed the protection of the cyber-infrastructure now underpinning economic and public services. NIST's authorization for work on cyber-system security runs out at the end of FY 2007. The Committee will return to study this topic.

Transportation research and development: The Committee will study research and development programs at the Department of Transportation and efforts to improve safety and efficiency in surface and water transportation.

Natural hazards monitoring and impact reduction: The Committee has supported interagency research programs to identify improvements in building and infrastructure designs to protect people when earthquakes occur. Evaluating further needs for these and other hazard types is ongoing.

U.S. Fire Administration: The Committee has another particular interest in the operations of the Department of Homeland Security. The U.S. Fire Administration is responsible for the Assistance to Firefighters grant program, and the Committee has closely monitored the direction of this program as the organizational structure of the Department has coalesced. Continued attention is important to assure first responders have necessary support and training.

Oversight: Research and Science Education Subcommittee

National Science Foundation oversight: The authorization for the National Science Foundation (NSF) expires at the end of Fiscal Year 2007. The National Academies' *Gathering Storm* report highlighted the budget straits of physical sciences, of which NSF is a major source for support, in the United States. Accordingly, the Committee will devote significant time to reviewing the agency's physical sciences program in preparation for reauthorization.

Science and Mathematics Education: Education, particularly in science and mathematics, is a vital component in the evolving economy. Members of the Committee have intense interests in efforts to improve the teaching of these subjects and develop better curricula for schools, and in determining the appropriate forms of federal support to achieve these outcomes.

Cooperative Relationships with Universities and Industry: Agencies and universities are again debating the level of scrutiny and control that should be applied to research in light of the possible use of new findings by terrorists. At the same time, industry questions the value of controls on technology sales and argues that such controls disproportionately limit American firms in competition for global sales. How to balance these competing interests remains a perennial subject for Committee oversight.

Computer Sciences and Technologies: The Committee will continue its studies of the contribution research can make to hardening computer networks, promoting U.S. leadership in technologies likely to make significant economic contributions in the future and continuing the long-term trend toward higher-performance, lower-cost technologies fueling the Internet revolution.

U.S. Antarctic Program: Since 1959, the U.S. has conducted operations on the Antarctic continent under the terms of the Antarctic Treaty System. Research there has been central to actions on protecting the Earth's stratospheric ozone layer, and is likely to be as critical to pending Congressional consideration of climate change issues. Of immediate interest is the future of the icebreaker fleet that provides vital logistical support for NSF's activities in the harsh polar environment.

Oversight: Energy and Environment Subcommittee

Alternative Energy Supplies: Volatility in oil prices is increasing interest in new fuel types for meeting the country's energy needs. Special attention is being given to biomass substitutes such as ethanol. The Department of Energy (DOE) helps to develop technologies for this purpose. Questions have been raised about the net energy efficiency gains and economic impacts of using food products as fuel.

Reviving Nuclear Power: Proponents argue that nuclear power offers an attractive solution to the problem of finding low-carbon power sources to mitigate greenhouse gas impacts. Public skepticism about the safety and economic value of such plants, however, remains high. DOE, the Nuclear Regulatory Commission and the power industry hope to restart reactor construction in the near future. The Committee will examine their readiness to do so and the status of proposed technologies.

Clean Coal Technology: The United States still has a massive reserve in coal to use for energy. Finding ways to remove impurities that contribute to air pollution, and then to reduce or sequester the resulting carbon dioxide emissions that contribute to global warming, may allow coal to continue its contribution as a relatively inexpensive fuel source.

Fusion and the ITER Demonstration: Technical challenges have for decades hampered our ability to harness nuclear fusion as an energy source. The United States has recently rejoined an international consortium preparing to construct the International Thermonuclear Experimental Reactor to demonstrate whether fusion could be produced in an economically viable manner. Committee Members supported the decision to participate and will follow the project's progress.

DOE Science programs: DOE, like NSF, plays a leading role in supporting U.S. physical science research. Budget limits are severely restricting these programs and limiting use of major facilities such as the Relativistic Heavy Ion Collider, the new Spallation Neutron Source and the Fermi National Accelerator Laboratory. Such cases raise questions about the decision to invest in such capabilities if the resources are not available to exploit them to the fullest.

Global Climate Change: Climate change sits at the nexus between energy and environmental policy. The Committee will support the broader discussion the Speaker intends to foster during the Congress through oversight of climate science programs at our agencies.

Oceans Agenda: The President's Ocean Action Plan is a major initiative aimed at addressing the future of our oceans. The Committee will monitor implementation of this plan, as well as federal oceans research and development policy generally.

DOE Laboratory Complex: The management and upkeep of the Department's aging facilities, particularly the clean-up of radioactive and hazardous material sites, remains a continuing concern of the Committee. Efforts will continue to assure that the Department meets its responsibilities to control risks in and around these facilities.

Part B—IMPLEMENTATION OF THE OVERSIGHT AGENDA AND OTHER OVERSIGHT ACTIVITIES

Oversight: Investigations and Oversight Subcommittee

Science Integrity Issues:

- Hearing entitled “*Shaping the Message, Distorting the Science: Media Strategies to Influence Public Policy*” (Subcommittee on Investigations and Oversight; March 28, 2007)
- Hearing entitled “*Transitioning the Environmental Measurement Laboratory to the Department of Homeland Security*” (Subcommittee on Investigations and Oversight; May 3, 2007)
- Hearing entitled “*Tracking the Storm at the National Hurricane Center*” (Subcommittee on Energy and Environment jointly with Subcommittee on Investigations and Oversight; July 19, 2007)
- Hearing entitled “*EPA’s Restructured IRIS System: Have Polluters and Politics Overwhelmed Science?*” (Subcommittee on Investigations and Oversight; May 21, 2008)
- Hearing entitled “*Toxic Communities: How EPA’s IRIS Program Fails the Public*” (Subcommittee on Investigations and Oversight; June 12, 2008)

OIRA Guidance of Agency Science

- Hearing entitled “*Amending Executive Order 12866: Good Governance or Regulatory Usurpation?*” (Subcommittee on Investigations and Oversight; February 13, 2007)
- Hearing entitled “*Amending Executive Order 12866: Good Governance or Regulatory Usurpation? Part II*” (Subcommittee on Investigations and Oversight; April 26, 2007)

Weather satellite modernization

- Hearing entitled “*National Imperatives for Earth and Climate Science Research and Applications Investments over the Next Decade: The Findings and Recommendations of the National Academies’ Decadal Survey of Earth Science and Applications from Space*” (Full Committee; February 13, 2007)
- Hearing entitled “*Status Report on the NPOESS Weather Satellite Program*” (Subcommittee on Energy and Environment; June 7, 2007)
- Hearing entitled “*GAO’s Report on the Status of NOAA’s Geostationary Environmental Satellite Program*” (Subcommittee on Energy and Environment; October 23, 2007)
- Hearing entitled “*An Insecure Forecast for Continuity of Climate and Weather Data: The NPOESS Weather Satellite Program*” (Subcommittee on Energy and Environment; June 19, 2008)

Voting system design and integrity

(No action taken)

Contracting Management

- Government Accountability Office Report entitled “*NASA Procurement: Use of Award Fees for Achieving Program Outcomes Should Be Improved;*” As Requested by Chairman (Released February 16, 2007)
- Hearing entitled “*The duPont Aerospace DP-2 Aircraft*” (Subcommittee on Investigations and Oversight; June 12, 2007)

Asset Management

- Hearing entitled “*The Department of Energy’s Support for the Savannah River Ecology Laboratory, Part I*” (Subcommittee on Investigations and Oversight jointly with Subcommittee on Energy and Environment; July 17, 2007)
- Hearing entitled “*The Department of Energy’s Support for the Savannah River Ecology Laboratory, Part II*” (Subcommittee on Investigations and Oversight jointly with Subcommittee on Energy and Environment; August 1, 2007)

- Hearing entitled “*EPA Library Closures: Better Access for a Broader Audience?*” (Subcommittee on Investigations and Oversight; March 13, 2008)
- Hearing entitled “*Oversight: Low-Level Plutonium Spill at NIST—Boulder; Contamination of Lab and Personnel*” (Subcommittee on Technology and Innovation; July 15, 2008)
- Hearing entitled “*Biobanking: How the Lack of a Coherent Policy Allowed the Veterans Administration to Destroy an Irreplaceable Collection of Legionella Samples*” (Subcommittee on Investigations and Oversight; September 9, 2008)

Oversight: Space and Aeronautics Subcommittee

Program and Funding Balance Between Space Science and Human Space Flight:

- Hearing entitled “*NASA’s Fiscal Year 2008 Budget Request*” (Full Committee; March 15, 2007)
- Hearing entitled “*NASA’s Space Science Programs: Review of Fiscal Year 2008 Budget Request and Issues*” (Subcommittee on Space and Aeronautics; May 2, 2007)
- Hearing entitled “*NASA’s Fiscal Year 2009 Budget Request*” (Full Committee; February 13, 2008)
- Hearing entitled “*NASA’s Science Programs: Fiscal Year 2009 Budget Request and Issues*” (Subcommittee on Space and Aeronautics; March 13, 2008)

Lunar Program Risk:

- Hearing entitled “*NASA’s Fiscal Year 2008 Budget Request*” (Full Committee; March 15, 2007)
- Government Accountability Office Report entitled “*Assessment of NASA’s Progress on Area I Crew Launch Vehicle;*” As Requested by Chairman (Released November 29, 2007)
- Hearing entitled “*NASA’s Fiscal Year 2009 Budget Request*” (Full Committee; February 13, 2008)
- Hearing entitled “*NASA’s Exploration Initiative: Status and Issues*” (Subcommittee on Space and Aeronautics; April 3, 2008)

Workforce Transition Issues:

- Hearing entitled “*Building and Maintaining a Healthy and Strong NASA Workforce*” (Subcommittee on Space and Aeronautics; May 17, 2007)

Contract, Financial and Program Management Challenges:

- Government Accountability Office Report entitled “*NASA Procurement: Use of Award Fees for Achieving Program Outcomes Should Be Improved;*” As Requested by Chairman (Released February 16, 2007)

Earth Science Continuity:

- Hearing entitled “*National Imperatives for Earth and Climate Science Research and Applications Investments over the Next Decade: The Findings and Recommendations of the National Academies’ Decadal Survey of Earth Science and Applications from Space*” (Full Committee; February 13, 2007)
- Hearing entitled “*NASA’s Fiscal Year 2008 Budget Request*” (Full Committee; March 15, 2007)
- Hearing entitled “*NASA’s Space Science Programs: Review of Fiscal Year 2008 Budget Request and Issues*” (Subcommittee on Space and Aeronautics; May 2, 2007)
- Hearing entitled “*NASA’s Earth Science and Applications Programs: Fiscal Year 2008 Budget Request and Issues*” (Subcommittee on Space and Aeronautics; June 28, 2007)
- Hearing entitled “*NASA’s Fiscal Year 2009 Budget Request*” (Full Committee; February 13, 2008)
- Hearing entitled “*NASA’s Science Programs: Fiscal Year 2009 Budget Requests and Issues*” (Subcommittee on Space and Aeronautics; March 13, 2008)

International Space Station:

- Hearing entitled “NASA’s Fiscal Year 2008 Budget Request” (Full Committee; March 15, 2007)
- Hearing entitled “NASA’s Space Shuttle and International Space Station Programs: Status and Issues” (Subcommittee on Space and Aeronautics; July 24, 2007)
- Hearing entitled “NASA’s Fiscal Year 2009 Budget Request” (Full Committee; February 13, 2008)
- Hearing entitled “NASA’s International Space Station Program: Status and Issues” (Subcommittee on Space and Aeronautics; April 24, 2008)

Aeronautics R&D:

- Hearing entitled “NASA’s Fiscal Year 2008 Budget Request” (Full Committee; March 15, 2007)
- Hearing entitled “NASA’s Fiscal Year 2009 Budget Request” (Full Committee; February 13, 2008)
- Hearing entitled “NASA’s Aeronautics R&D Program: Status and Issues” (Subcommittee on Space and Aeronautics; May 1, 2008)

FAA R&D:

- Hearing entitled “The Federal Aviation Administration’s R&D Budget Priorities for Fiscal Year 2008” (Subcommittee on Space and Aeronautics; March 22, 2007)
- Hearing entitled “The Joint Planning and Development Office and the Next Generation Air Transportation System: Status and Issues” (Subcommittee on Space and Aeronautics; March 29, 2007)
- Hearing entitled “The Next Generation Air Transportation System: Status and Issues” (Full Committee; September 11, 2008)

FAA Commercial Space Transportation:

(No Action Taken)

Oversight: Technology and Innovation Subcommittee*Commerce Department technology programs*

- Hearing entitled “The National Institute of Standards and Technology’s Role in Supporting Economic Competitiveness in the 21st Century: the FY 2008 Budget Request” (Subcommittee on Technology and Innovation; February 15, 2007)
- Hearing entitled “Funding for the America COMPETES Act in the FY 2009 Administration Budget Request” (Full Committee, February 14, 2008)
- Hearing entitled “NIST’s FY 2009 Budget Request: What Are the Right Technology Investments to Promote U.S. Innovation and Competitiveness?” (Subcommittee on Technology and Innovation; March 11, 2008)

American economic competitiveness

- Hearing entitled “Science and Technology Leadership in a 21st Century Global Economy” (Full Committee; March 13, 2007)
- Hearing entitled “The Globalization of R&D and Innovation, Part I” (Full Committee; June 12, 2007)
- Hearing entitled “The Globalization of R&D and Innovation, Part II” (Full Committee; July 26, 2007)
- Hearing entitled “The Globalization of R&D and Innovation, Part III: How do Companies Choose Where to Build R&D Facilities?” (Subcommittee on Technology and Innovation; October 4, 2007)
- Hearing entitled “The Globalization of R&D and Innovation, Part IV: Implications for the Science and Engineering Workforce” (Subcommittee on Technology and Innovation; November 6, 2007)
- Hearing entitled “Funding for the America COMPETES Act in the FY 2009 Administration Budget Request” (Full Committee; February 14, 2008)

- Hearing entitled “*Competitiveness and Innovation on the Committee’s 50th Anniversary with Bill Gates, Chairman of Microsoft*” (Full Committee; March 12, 2008)
- Hearing entitled “*American Decline or Renewal?—Globalizing Jobs and Technology*” (Subcommittee on Investigations and Oversight; May 22, 2008)

Technology transfer

- Hearing entitled “*Small Business Innovation Research Reauthorization on the 25th Program Anniversary*” (Subcommittee on Technology and Innovation; April 26, 2007)
- Hearing entitled “*SBIR and STTR: How are the Programs Managed Today?*” (Subcommittee on Technology and Innovation; June 26, 2007)
- Hearing entitled “*Bayh-Dole—The Next 25 Years*” (Subcommittee on Technology and Innovation; July 17, 2007)

Cyber security

(No Action Taken)

Transportation research and development

- Hearing entitled “*Green Transportation Infrastructure: Challenges to Access and Implementation*” (Subcommittee on Technology and Innovation; May 10, 2007)
- Hearing entitled “*Bridge Safety: Next Steps to Protect the Nation’s Critical Infrastructure*” (Full Committee; September 19, 2007)
- Hearing entitled “*Sustainable, Energy-Efficient Transportation Infrastructure*” (Subcommittee on Technology and Innovation; June 24, 2008)

Natural hazards monitoring and impact reduction

- Hearing entitled “*The National Windstorm Impact Reduction Program: Strengthening Windstorm Hazard Mitigation*” (Subcommittee on Technology and Innovation; July 24, 2008)

U.S. Fire Administration

- Hearing entitled “*The United States Fire Administration Reauthorization: Addressing the Priorities of the Nation’s Fire Service*” (Subcommittee on Technology and Innovation; October 2, 2007)

Oversight: Research and Science Education Subcommittee

National Science Foundation oversight

- Hearing entitled “*National Science Foundation Reauthorization, Part I*” (Subcommittee on Research and Science Education; March 20, 2007)
- Hearing entitled “*National Science Foundation Reauthorization: Part II*” (Subcommittee on Research and Science Education; March 29, 2007)
- Hearing entitled “*Funding for the America COMPETES Act in the FY 2009 Administration Budget Request*” (Full Committee; February 14, 2008)
- Hearing entitled “*Oversight of the National Science Foundation*” (Subcommittee on Research and Science Education; February 26, 2008)

Science and Mathematics Education

- Hearing entitled “*Federal STEM Programs: Educators’ Perspective*” (Subcommittee on Research and Science Education; May 15, 2007)
- Hearing entitled “*Federal STEM Education Programs*” (Subcommittee on Research and Science Education; June 6, 2007)
- Hearing entitled “*The Role of Community Colleges and Industry in Meeting the Demand for Skilled Production Workers and Technicians in the 21st Century Economy*” (Subcommittee on Research and Science Education; June 19, 2007)

- Hearing entitled “*Assessment of the National Science Board’s Action Plan for STEM Education*” (Subcommittee on Research and Science Education; October 10, 2007)
- Hearing entitled “*Women in Academic Science and Engineering*” (Subcommittee on Research and Science Education; October 17, 2007)
- Hearing entitled “*Funding for the America COMPETES Act in the FY 2009 Administration Budget Request*” (Full Committee; February 14, 2008)
- Hearing entitled “*STEM Education Before High School: Shaping our Future Science, Technology, Engineering and Math Leaders of Tomorrow by Inspiring Our Children Today*” (Full Committee; May 12, 2008)

Cooperative Relationships with Universities and Industry

(No Action Taken)

Computer Sciences and Technologies

- Hearing entitled “*Oversight of the Federal Networking and Information Technology Research and Development (NITRD) Program*” (Full Committee; July 31, 2008)

U.S. Antarctic Program

- Hearing entitled “*National Science Foundation Reauthorization: Part I*” (Subcommittee on Research and Science Education; March 20, 2007)
- Hearing entitled “*Funding for the America COMPETES Act in the FY 2009 Administration Budget Request*” (Full Committee; February 14, 2008)
- Hearing entitled “*Oversight of the National Science Foundation*” (Subcommittee on Research and Science Education; February 26, 2008)

Oversight: Energy and Environment Subcommittee

Alternative Energy Supplies

- Hearing entitled “*A Path Toward the Broader Use of Biofuels: Enhancing the Federal Commitment to Research and Development to Meet the Growing Need*” (Subcommittee on Energy and Environment; June 14, 2007)

Reviving Nuclear Power

- Hearing entitled “*Department of Energy Budget Request for Fiscal Year 2008*” (Subcommittee on Energy and Environment; March 7, 2007)
- Hearing entitled “*Department of Energy Budget Request for Fiscal Year 2009*” (Subcommittee on Energy and Environment; March 5, 2008)
- Hearing entitled “*Opportunities and Challenges for Nuclear Power*” (Full Committee; April 23, 2008)

Clean Coal Technology

- Hearing entitled “*Department of Energy Budget Request for Fiscal Year 2008*” (Subcommittee on Energy and Environment; March 7, 2007)
- Hearing entitled “*Prospects for Advanced Coal Technologies: Efficient Energy Production, Carbon Capture and Sequestration*” (Subcommittee on Energy and Environment; May 15, 2007)
- Hearing entitled “*Department of Energy Budget Request for Fiscal Year 2009*” (Subcommittee on Energy and Environment; March 5, 2008)
- Hearing entitled “*The Department of Energy’s FutureGen Program*” (Subcommittee on Energy and Environment; April 15, 2008)

Fusion and the ITER Demonstration

- Hearing entitled “*Department of Energy Budget Request for Fiscal Year 2008*” (Subcommittee on Energy and Environment; March 7, 2007)
- Hearing entitled “*Department of Energy Budget Request for Fiscal Year 2009*” (Subcommittee on Energy and Environment; March 5, 2008)

DOE Science programs

- Hearing entitled “*Department of Energy Budget Request for Fiscal Year 2008*” (Subcommittee on Energy and Environment; March 7, 2007)
- Hearing entitled “*Funding for the America COMPETES Act in the FY 2009 Administration Budget Request*” (Full Committee; February 14, 2008)
- Hearing entitled “*Department of Energy Budget Request for Fiscal Year 2009*” (Subcommittee on Energy and Environment; March 5, 2008)
- Hearing entitled “*The Foundation for Developing New Energy Technologies: Basic Energy Research in the DOE Office of Science*” (Subcommittee on Energy and Environment; September 10, 2008)

Global Climate Change

- Hearing entitled “*The State of Climate Change Science 2007; The Findings of the Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC), Working Group I Report*” (Full Committee; February 8, 2007)
- Hearing entitled “*National Imperatives for Earth and Climate Science Research and Applications Investments over the Next Decade: The Findings and Recommendations of the National Academies’ Decadal Survey of Earth Science and Applications from Space*” (Full Committee; February 13, 2007)
- Hearing entitled “*Perspectives on Climate Change*” (Subcommittee on Energy and Environment jointly with Energy and Air Quality Subcommittee of the Committee on Energy and Commerce; March 21, 2007)
- Hearing entitled “*The State of Climate Change Science 2007: The Findings of the Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC). Working Group II: Climate Change Impacts, Adaptation and Vulnerability*” (Full Committee; April 17, 2007)
- Hearing entitled “*The State of Climate Change Science 2007: The Findings of the Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC), Working Group III: Mitigation of Climate Change*” (Full Committee; May 16, 2007)
- Hearing entitled “*The National Security Implications of Climate Change*” (Subcommittee on Investigations and Oversight; September 27, 2007)
- Hearing entitled “*Disappearing Polar Bears and Permafrost: Is a Global Warming Tipping Point Embedded in the Ice?*” (Subcommittee on Investigations and Oversight; October 17, 2007)

Oceans Agenda:

- Hearing entitled “*NOAA’s FY 2008 Budget Proposal*” (Subcommittee on Energy and Environment; March 22, 2007)
- Hearing entitled “*The National Oceanic and Atmospheric Administration’s Fiscal Year 2009 Budget Proposal and GAO’s Report on the Aviation Weather Service*” (Subcommittee on Energy and Environment; February 26, 2008)

DOE Laboratory Complex

- Hearing entitled “*The Department of Energy’s Support for the Savannah River Ecology Laboratory, Part I*” (Subcommittee on Investigations and Oversight jointly with Subcommittee on Energy and Environment; July 17, 2007)
- Hearing entitled “*The Department of Energy’s Support for the Savannah River Ecology Laboratory, Part II*” (Subcommittee on Investigations and Oversight jointly with Subcommittee on Energy and Environment; August 1, 2007)

Oversight: Other Oversight Activities

- Hearing entitled “*The Department of Homeland Security’s R&D Budget Priorities for Fiscal Year 2008*” (Subcommittee on Technology and Innovation; March 8, 2007)
- Hearing entitled “*EPA’s FY 2008 Science and Technology Budget Proposal*” (Subcommittee on Energy and Environment; March 14, 2007)
- Investigation into Alleged Research Misconduct at Purdue University (Subcommittee on Investigations and Oversight; Report Released May 7, 2007)

- Hearing entitled “*The NASA Administrator’s Speech to Office of Inspector General Staff, the Subsequent Destruction of Video Records, and Associated Matters*” (Subcommittee on Investigations and Oversight; May 24, 2007)
- Hearing entitled “*The Role of Technology in Reducing Illegal Filesharing: A University Perspective*” (Full Committee; June 5, 2007)
- Hearing entitled “*NASA Inspector General Robert ‘Moose’ Cobb*” (Subcommittee on Investigations and Oversight jointly with Senate Subcommittee on Space, Aeronautics and Related Sciences; June 7, 2007)
- Hearing entitled “*The Benefits and Challenges of Producing Liquid Fuel from Coal: The Role for Federal Research*” (Subcommittee on Energy and Environment; September 5, 2007)
- Hearing entitled “*NASA’s Astronaut Health Care System—Results of an Independent Review*” (Subcommittee on Space and Aeronautics; September 6, 2007)
- Hearing entitled “*The Contribution of the Social Sciences to the Energy Challenge*” (Subcommittee on Research and Science Education; September 25, 2007)
- Hearing entitled “*Radiological Response: Assessing Environmental and Clinical Laboratory Capabilities*” (Subcommittee on Investigations and Oversight; October 25, 2007)
- Hearing entitled “*Research on Environmental and Safety Impacts of Nanotechnology: Current Status of Planning and Implementation Under the National Nanotechnology Initiative*” (Subcommittee on Research and Science Education; October 31, 2007)
- Hearing entitled “*Aviation Safety: Can NASA Do More to Protect the Public?*” (Full Committee; October 31, 2007)
- Hearing entitled “*Near-Earth Objects (NEOs)—Status of the Survey Program and Review of NASA’s 2007 Report to Congress*” (Subcommittee on Space and Aeronautics; November 8, 2007)
- Hearing entitled “*Status of Visas and Other Policies for Foreign Scholars and Students*” (Subcommittee on Research and Science Education; February 7, 2008)
- Hearing entitled “*The Department of Homeland Security’s R&D Budget Priorities for Fiscal Year 2009*” (Subcommittee on Technology and Innovation; March 6, 2008)
- Hearing entitled “*The Transfer of National Nanotechnology Initiative Research Outcomes for Commercial and Public Benefit*” (Subcommittee on Research and Science Education; March 11, 2008)
- Hearing entitled “*Aviation Security Research and Development at the Department of Homeland Security*” (Subcommittee on Technology and Innovation; April 24, 2008)
- Hearing entitled “*Electronic Waste: Can the Nation Manage Refuse in the Digital Age?*” (Full Committee; April 30, 2008)
- Hearing entitled “*Water Supply Challenges for the 21st Century*” (Full Committee; May 14, 2008)
- Hearing entitled “*Toxic Trailers: Have the Centers for Disease Control Failed to Protect Public Health?*” (Subcommittee on Investigations and Oversight; April 1, 2008)
- Hearing entitled “*International Science and Technology Cooperation*” (Subcommittee on Research and Science Education; April 2, 2008)
- Hearing entitled “*Role of the Social and Behavioral Sciences in National Security*” (Subcommittee on Research and Science Education jointly with the Subcommittee on Terrorism, Unconventional Threats and Capabilities of the Committee on Armed Services; April 24, 2008)
- Hearing entitled “*Harmful Algal Blooms: Challenges on the Nation’s Coastlines*” (Subcommittee on Energy and Environment; July 10, 2008)
- Hearing entitled “*The Role of Non-governmental Organizations and Universities in International Science and Technology Cooperation*” (Subcommittee on Research and Science Education; July 15, 2008)
- Hearing entitled “*NASA at 50: Past Accomplishments and Future Opportunities and Challenges*” (Full Committee; July 30, 2008)

- Hearing entitled *“The Role of Social and Behavioral Sciences in Public Health”* (Subcommittee on Research and Science Education; September 18, 2008)

History of Appointments Committee on Science and Technology ONE HUNDRED TENTH CONGRESS

January 4, 2007—H.Res. 7

Bart Gordon, Tennessee, was named Chairman of the Committee on Science and Technology.

January 4, 2007—H.Res. 8

Ralph Hall, Texas, was named as Ranking Member of the Committee on Science and Technology.

January 10, 2007—H.Res. 45

Republican Members assigned to the Committee on Science and Technology:

Mr. Sensenbrenner, Mr. Smith of Texas, Mr. Rohrabacher, Mr. Calvert, Mr. Bartlett of Maryland, Mr. Ehlers, Mr. Lucas, Mrs. Biggert, Mr. Akin, Mr. Bonner, Mr. Feeney, Mr. Neugebauer, Mr. Inglis of South Carolina, Mr. McCaul of Texas, Mr. Mario Diaz-Balart of Florida, Mr. Gingrey, Mr. Bilbray, and Mr. Smith of Nebraska.

January 18, 2007—H.Res. 75

Democratic Members assigned to the Committee on Science and Technology:

Mr. Costello, Ms. Eddie Bernice Johnson of Texas, Ms. Woolsey, Mr. Udall of Colorado, Mr. Wu, Mr. Baird, Mr. Miller of North Carolina, Mr. Lipinski, Mr. Lampson, Ms. Giffords, Mr. McNerney, Mr. Rothman, Mr. Honda, Mr. Matheson, Mr. Ross, Mr. Chandler, Mr. Carnahan, Mr. Melancon, Mr. Hill, Mr. Mitchell, and Mr. Wilson of Ohio.

January 23, 2007—H.Res. 85

Democratic Members the Honorable **Mr. Kanjorski** (to rank immediately after the Honorable **Mr. McNerney**) and the Honorable **Ms. Hooley** (to rank immediately after **Mr. Kanjorski**) were appointed to the Committee on Science and Technology.

March 12, 2007—H.Res. 236

Republican Member the Honorable **Mr. Reichert of Washington** appointed to the Committee on Science and Technology to rank immediately after the Honorable **Mr. Inglis of South Carolina**.

May 10, 2007—H.Res. 393

Republican Member the Honorable **Ken Calvert of California** resigned from the Committee on Science and Technology to accept assignment to the Committee on Appropriations.

July 25, 2007—H.Res. 566

Republican Member the Honorable **Paul C. Broun of Georgia** was appointed to fill a vacancy on the Committee on Science and Technology.

September 20, 2007—

Democratic Member the Honorable **Michael Honda of California** resigned from the Committee on Science and Technology.

September 20, 2007—H.Res. 667

Democratic Member the Honorable **Laura Richardson of California** was appointed to fill a vacancy on the Committee on Science and Technology.

February 25, 2008—

Republican Member the Honorable **Jo Bonner of Alabama** resigned from the Committee on Science and Technology.

June 10, 2008—H.Res. 1256

Democratic Member the Honorable **André Carson of Indiana** appointed to fill a vacancy on the Committee on Science and Technology.

July 15, 2008—H.Res. 1342

Democratic Member the Honorable **Donna Edwards of Maryland** appointed to fill a vacancy on the Committee on Science and Technology.

**RULES GOVERNING PROCEDURE OF
COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
FOR THE ONE HUNDRED TENTH CONGRESS**

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RULE 1. GENERAL PROVISIONS**General Statement**

(a) The Rules of the House of Representatives, as applicable, shall govern the Committee and its Subcommittees, except that a motion to recess from day to day and a motion to dispense with the first reading (in full) of a bill or resolution, if printed copies are available, are privileged motions in the Committee and its Subcommittees and shall be decided without debate. The rules of the Committee, as applicable, shall be the rules of its Subcommittees. The rules of germaneness shall be enforced by the Chairman. [XI 1(a)]

Membership

(b) A majority of the Majority Members of the Committee shall determine an appropriate ratio of Majority to Minority Members of each Subcommittee and shall authorize the Chairman to negotiate that ratio with the Minority party; Provided, however, that party representation on each Subcommittee (including any ex-officio Members) shall be no less favorable to the Majority party than the ratio for the Full Committee. Provided, further, that recommendations of conferees to the Speaker shall provide a ratio of Majority party Members to Minority party Members which shall be no less favorable to the Majority party than the ratio of the Full Committee.

Power to Sit and Act; Subpoena Power

(c)(1) Notwithstanding paragraph (2), a subpoena may be authorized and issued in the conduct of any investigation or series of investigations or activities to require the attendance and testimony of such witnesses and the production of such books, records, correspondence, memoranda, papers and documents as deemed necessary, only when authorized by Majority vote of the Full Committee or Subcommittee (as the case may be), a majority of the Committee or Subcommittee being present. Authorized subpoenas shall be signed only by the Chairman of the Full Committee, or by any Member designated by the Chairman. [XI 2(m)]

(2) The Chairman of the Full Committee, after consultation with the Ranking Minority Member of the Full Committee, or if the Ranking Member cannot be reached, the Ranking Minority Member of the relevant Subcommittee, may authorize and issue such subpoenas as described in paragraph (1), during any period in which the House has adjourned for a period longer than seven (7) days. [XI 2(m)(3)(A)(i)]

(3) A subpoena duces tecum may specify terms of return other than at a meeting or a hearing of the Committee.

Sensitive or Confidential Information Received Pursuant to Subpoena

(d) Unless otherwise determined by the Committee or Subcommittee, certain information received by the Committee or Subcommittee pursuant to a subpoena not made part of the record at an open hearing shall be deemed to have been received in Executive Session when the Chairman of the Full Committee, in his judgment and after consultation with the Ranking Minority Member, deems that in view of all the circumstances, such as the sensitivity of the information or the confidential nature of the information, such action is appropriate.

National Security Information

(e) All national security information bearing a classification of secret or higher which has been received by the Committee or a Subcommittee shall be deemed to have been received in Executive Session and shall be given appropriate safekeeping. The Chairman of the Full Committee may establish such regulations and procedures as in his judgment are necessary to safeguard classified information under the control of the Committee. Such procedures shall, however, ensure access to this information by any Member of the Committee, or any other Member of the House of Representatives who has requested the opportunity to review such material.

Oversight

(f) Not later than February 15 of the first session of a Congress, the Committee shall meet in open session, with a quorum present, to adopt its oversight plans for

that Congress for submission to the Committee on Government Reform and the Committee on House Administration, in accordance with the provisions of clause 2(d) of Rule X of the House of Representatives.

(g) The Chairman of the Full Committee may undertake any formal investigation in the name of the Committee after consultation with the Ranking Minority Member of the Full Committee.

(h) The Chairman of any Subcommittee shall not undertake any formal investigation in the name of the Full Committee or Subcommittee without formal approval by the Chairman of the Full Committee, in consultation with other appropriate Subcommittee Chairmen, and after consultation with the Ranking Minority Member of the Full Committee. The Chairman of any Subcommittee shall also consult with the Ranking Minority Member of the Subcommittee before undertaking any investigation in the name of the Committee.

Order of Business

(i) The order of business and procedure of the Committee and the subjects of inquiries or investigations will be decided by the Chairman, subject always to an appeal to the Committee.

Suspended Proceedings

(j) During the consideration of any measure or matter, the Chairman of the Full Committee, or of any Subcommittee, or any Member acting as such, may recess the Committee at any point. Additionally, during the consideration of any measure or matter, the Chairman of the Full Committee, or of any Subcommittee shall suspend further proceedings after a question has been put to the Committee at any time when there is a vote by electronic device occurring in the House of Representatives. Suspension of proceedings after a record vote is ordered on the question of approving a measure or matter or on adopting an amendment, shall be conducted in compliance with the provisions of Rule 2(t).

Other Procedures

(k) The Chairman of the Full Committee, after consultation with the Ranking Minority Member, may establish such other procedures and take such actions as may be necessary to carry out the foregoing rules or to facilitate the effective operation of the Committee.

Use of Hearing Rooms

(l) In consultation with the Ranking Minority Member, the Chairman of the Full Committee shall establish guidelines for use of Committee hearing rooms.

RULE 2. COMMITTEE MEETINGS AND PROCEDURES

Quorum [XI 2(h)]

(a)(1) One-third of the Members of the Committee shall constitute a quorum for all purposes except as provided in paragraphs (2) and (3) of this Rule.

(2) A majority of the Members of the Committee shall constitute a quorum in order to: (A) report or table any legislation, measure, or matter; (B) close Committee meetings or hearings pursuant to Rules 2(c) and 2(d); and, (C) authorize the issuance of subpoenas pursuant to Rule 1(c).

(3) Two (2) Members of the Committee shall constitute a quorum for taking testimony and receiving evidence, which, unless waived by the Chairman of the Full Committee after consultation with the Ranking Minority Member of the Full Committee, shall include at least one (1) Member from each of the Majority and Minority parties.

Time and Place

(b)(1) Unless dispensed with by the Chairman, the meetings of the Committee shall be held on the 2nd and 4th Wednesdays of each month the House is in session at 10:00 a.m. and at such other times and in such places as the Chairman may designate. [XI 2(b)]

(2) The Chairman of the Committee may convene, as necessary, additional meetings of the Committee for the consideration of any bill or resolution pending before the Committee or for the conduct of other Committee business subject to such rules as

the Committee may adopt. The Committee shall meet for such purpose under that call of the Chairman. [XI 2(c)]

(3) The Chairman shall make a public announcement of the date, time, place and subject matter of any of its hearings, and to the extent practicable, a list of witnesses at least one (1) week before the commencement of the hearing. If the Chairman, with the concurrence of the Ranking Minority Member, determines there is good cause to begin the hearing sooner, or if the Committee so determines by majority vote, a quorum being present for the transaction of business, the Chairman shall make the announcement at the earliest possible date. Any announcement made under this Rule shall be promptly published in the *Daily Digest*, and promptly made available by electronic form, including the Committee website. [XI 2(g)(3)]

Open Meetings [xi 2(g)]

(c) Each meeting for the transaction of business, including the markup of legislation, of the Committee shall be open to the public, including to radio, television, and still photography coverage, except when the Committee, in open session and with a majority present, determines by record vote that all or part of the remainder of the meeting on that day shall be in executive session because disclosure of matters to be considered would endanger national security, would compromise sensitive law enforcement information, would tend to defame, degrade or incriminate any person or otherwise would violate any law or rule of the House. Persons other than Members of the Committee and such non-Committee Members, Delegates, Resident Commissioner, congressional staff, or departmental representatives as the Committee may authorize, may not be present at a business or markup session that is held in executive session. This Rule does not apply to open Committee hearings which are provided for by Rule 2(d).

(d)(1) Each hearing conducted by the Committee shall be open to the public including radio, television, and still photography coverage except when the Committee, in open session and with a majority present, determines by record vote that all or part of the remainder of that hearing on that day shall be closed to the public because disclosure of testimony, evidence, or other matters to be considered would endanger national security, would compromise sensitive law enforcement information, or would violate a law or rule of the House of Representatives. Notwithstanding the requirements of the preceding sentence, and Rule 2(q) a majority of those present, there being in attendance the requisite number required under the rules of the Committee to be present for the purpose of taking testimony:

(A) may vote to close the hearing for the sole purpose of discussing whether testimony or evidence to be received would endanger the national security, would compromise sensitive law enforcement information or would violate Rule XI 2(k)(5) of the Rules of the House of Representatives; or

(B) may vote to close the hearing, as provided in Rule XI 2(k)(5) of the Rules of the House of Representatives. No Member, Delegate, or Resident Commissioner may be excluded from non-participatory attendance at any hearing of any Committee or Subcommittee, unless the House of Representatives shall by majority vote authorize a particular Committee or Subcommittee, for purposes of a particular series of hearings on a particular article of legislation or on a particular subject of investigation, to close its hearings to Members, Delegate, and the Resident Commissioner by the same procedures designated in this Rule for closing hearings to the public; Provided, however, that the Committee or Subcommittee may by the same procedure, vote to close one subsequent day of the hearing.

Audio and Visual Coverage [XI, clause 4]

(e)(1) Whenever a hearing or meeting conducted by the Committee is open to the public, these proceedings shall be open to coverage by television, radio, and still photography, except as provided in Rule XI 4(f)(2) of the House of Representatives. The Chairman shall not be able to limit the number of television, or still cameras to fewer than two (2) representatives from each medium (except for legitimate space or safety considerations in which case pool coverage shall be authorized).

(2)(A) Radio and television tapes, television film, and Internet recordings of any Committee hearings or meetings that are open to the public may not be used, or made available for use, as partisan political campaign material to promote or oppose the candidacy of any person for elective public office.

(B) It is, further, the intent of this rule that the general conduct of each meeting or hearing covered under authority of this rule by audio or visual means, and the

personal behavior of the Committee Members and staff, other government officials and personnel, witnesses, television, radio, and press media personnel, and the general public at the meeting or hearing, shall be in strict conformity with and observance of the acceptable standards of dignity, propriety, courtesy, and decorum traditionally observed by the House in its operations, and may not be such as to:

(i) distort the objects and purposes of the meeting or hearing or the activities of Committee Members in connection with that meeting or hearing or in connection with the general work of the Committee or of the House; or

(ii) cast discredit or dishonor on the House, the Committee, or a Member, Delegate, or Resident Commissioner or bring the House, the Committee, or a Member, Delegate, or Resident Commissioner into disrepute.

(C) The coverage of Committee meetings and hearings by audio and visual means shall be permitted and conducted only in strict conformity with the purposes, provisions, and requirements of this rule.

(f) The following shall apply to coverage of Committee meetings or hearings by audio or visual means:

(1) If audio or visual coverage of the hearing or meeting is to be presented to the public as live coverage, that coverage shall be conducted and presented without commercial sponsorship.

(2) The allocation among the television media of the positions or the number of television cameras permitted by a Committee or Subcommittee Chairman in a hearing or meeting room shall be in accordance with fair and equitable procedures devised by the Executive Committee of the Radio and Television Correspondents' Galleries.

(3) Television cameras shall be placed so as not to obstruct in any way the space between a witness giving evidence or testimony and any Member of the Committee or the visibility of that witness and that Member to each other.

(4) Television cameras shall operate from fixed positions but may not be placed in positions that obstruct unnecessarily the coverage of the hearing or meeting by the other media.

(5) Equipment necessary for coverage by the television and radio media may not be installed in, or removed from, the hearing or meeting room while the Committee is in session.

(6)(A) Except as provided in subdivision (B), floodlights, spotlights, strobelights, and flashguns may not be used in providing any method of coverage of the hearing or meeting.

(B) The television media may install additional lighting in a hearing or meeting room, without cost to the Government, in order to raise the ambient lighting level in a hearing or meeting room to the lowest level necessary to provide adequate television coverage of a hearing or meeting at the current state of the art of television coverage.

(7) In the allocation of the number of still photographers permitted by a Committee or Subcommittee Chairman in a hearing or meeting room, preference shall be given to photographers from Associated Press Photos and United Press International Newspictures. If requests are made by more of the media than will be permitted by a Committee or Subcommittee Chairman for coverage of a hearing or meeting by still photography, that coverage shall be permitted on the basis of a fair and equitable pool arrangement devised by the Standing Committee of Press Photographers.

(8) Photographers may not position themselves between the witness table and the Members of the Committee at any time during the course of a hearing or meeting.

(9) Photographers may not place themselves in positions that obstruct unnecessarily the coverage of the hearing by the other media.

(10) Personnel providing coverage by the television and radio media shall be currently accredited to the Radio and Television Correspondents' Galleries.

(11) Personnel providing coverage by still photography shall be currently accredited to the Press Photographers' Gallery.

(12) Personnel providing coverage by the television and radio media and by still photography shall conduct themselves and their coverage activities in an orderly and unobtrusive manner.

Special Meetings

(g) Rule XI 2(c) of the Rules of the House of Representatives is hereby incorporated by reference (Special Meetings).

Vice Chairman to Preside in Absence of Chairman

(h) A Member of the Majority party on the Committee, or any Subcommittee, shall be designated by the Chairman of the Full Committee as the Vice Chairman of the Committee or Subcommittee, as the case may be, and shall preside during the absence of the Chairman from any meeting. If the Chairman and Vice-Chairman of the Committee or Subcommittee are not present at any meeting of the Committee or Subcommittee, the Ranking Majority Member who is present shall preside at that meeting. [XI 2(d)]

Opening Statements; 5-Minute Rule

(i) Insofar as is practicable, the Chairman, after consultation with the Ranking Minority Member, shall limit the total time of opening statements by Members to no more than 10 minutes, the time to be divided equally between the Chairman and Ranking Minority Member. The time any one (1) Member may address the Committee on any bill, motion or other matter under consideration by the Committee or the time allowed for the questioning of a witness at hearings before the Committee will be limited to five (5) minutes, and then only when the Member has been recognized by the Chairman, except that this time limit may be waived by the Chairman or acting Chairman. [XI 2(j)]

(j) Notwithstanding Rule 2(i), upon a motion the Chairman, in consultation with the Ranking Minority Member, may designate an equal number of Members from each party to question a witness for a period not to exceed one (1) hour in the aggregate or, upon a motion, may designate staff from each party to question a witness for equal specific periods that do not exceed one (1) hour in the aggregate. [XI 2(j)]

Proxies

(k) No Member may authorize a vote by proxy with respect to any measure or matter before the Committee. [XI 2(f)]

Witnesses

(1)(1) Insofar as is practicable, each witness who is to appear before the Committee shall file no later than 24 hours in advance of his or her appearance, both a statement of the proposed testimony and a curriculum vitae in printed copy and electronic form. Each witness shall limit his or her presentation to a five (5) minute summary, provided that additional time may be granted by the Chairman when appropriate. [XI 2(g)(4)]

(2) To the greatest extent practicable, each witness appearing before the Committee shall include with the written statement of proposed testimony a disclosure of any financial interests which are relevant to the subject of his or her testimony. These include, but are not limited to, public and private research grants, stock or stock options held in publicly traded and privately owned companies, and any form of payment or compensation from any relevant entity. The source and amount of the financial interest should be included in this disclosure.

(3) Members of the Committee have two weeks from the date of a hearing to submit additional questions for the record, to be answered by witnesses who have appeared in person. The letters of transmittal and any responses thereto shall be printed in the hearing record.

(m) Whenever any hearing is conducted by the Committee on any measure or matter, the Minority Members of the Committee shall be entitled, upon request to the Chairman by a majority of them before the completion of the hearing, to call witnesses selected by the Minority to testify with respect to the measure or matter during at least one (1) day of hearing thereon. [XI 2(j)(1)]

Hearing Procedures

(n) Rule XI 2(k) of the Rules of the House of Representatives is hereby incorporated by reference.

Bill and Subject Matter Consideration

(o) Bills and other substantive matters may be taken up for consideration only when called by the Chairman of the Committee or by a majority vote of a quorum of the

Committee, except those matters which are the subject of special-call meetings outlined in Rule 2(g). [XI 2(c)]

Private Bills

(p) No private bill will be reported by the Committee if there are two (2) or more dissenting votes. Private bills so rejected by the Committee will not be reconsidered during the same Congress unless new evidence sufficient to justify a new hearing has been presented to the Committee.

Consideration of Measure or Matter

(q)(1) It shall not be in order for the Committee to consider any new or original measure or matter unless written notice of the date, place and subject matter of consideration and to the maximum extent practicable, a written copy of the measure or matter to be considered, and to the maximum extent practicable the original text for purposes of markup of the measure to be considered have been available to each Member of the Committee for at least 48 hours in advance of consideration, excluding Saturdays, Sundays and legal holidays. To the maximum extent practicable, amendments to the measure or matter to be considered, shall be submitted in writing to the Clerk of the Committee at least 24 hours prior to the consideration of the measure or matter.

(2) Notwithstanding paragraph (1) of this rule, consideration of any legislative measure or matter by the Committee shall be in order by vote of two-thirds of the Members present, provided that a majority of the Committee is present.

Requests for Written Motions

(r) Any legislative or non-procedural motion made at a regular or special meeting of the Committee and which is entertained by the Chairman shall be presented in writing upon the demand of any Member present and a copy made available to each Member present.

Requests for Record Votes at Full Committee

(s) A record vote of the Members may be had at the request of three (3) or more Members or, in the apparent absence of a quorum, by any one (1) Member.

Postponement of Proceedings

(t) The Chairman of the Full Committee, or of any Subcommittee, is authorized to postpone further proceedings when a record vote is ordered on the question of approving a measure or matter or on adopting an amendment, and to resume proceedings on a postponed question at any time after reasonable notice. Upon resuming proceedings on a postponed question, notwithstanding any intervening order for the previous question, an underlying proposition shall remain subject to further debate or amendment to the same extent as when the question was postponed. [XI (2)(h)(4)]

Report Language on Use of Federal Resources

(u) No legislative report filed by the Committee on any measure or matter reported by the Committee shall contain language which has the effect of specifying the use of federal resources more explicitly (inclusively or exclusively) than that specified in the measure or matter as ordered reported, unless such language has been approved by the Committee during a meeting or otherwise in writing by a majority of the Members.

Committee Records

(v)(1) The Committee shall keep a complete record of all Committee action which shall include a record of the votes on any question on which a record vote is demanded. The result of each record vote shall be made available by the Committee for inspection by the public at reasonable times in the offices of the Committee. Information so available for public inspection shall include a description of the amendment, motion, order, or other proposition and the name of each Member voting for and each Member voting against such amendment, motion, order, or proposition, and the names of those Members present but not voting. [XI 2(e)]

(2) The records of the Committee at the National Archives and Records Administration shall be made available for public use in accordance with Rule VII of the Rules of the House of Representatives. The Chairman shall notify the Ranking Minority Member of any decision, pursuant to clause 3(b)(3) or clause 4(b) of the Rule, to

withhold a record otherwise available, and the matter shall be presented to the Committee for a determination on the written request of any Member of the Committee. [XI 2(e)(3)]

(3) To the maximum extent feasible, the Committee shall make its publications available in electronic form, including the Committee website. [XI 2(e)(4)]

(4)(A) Except as provided for in subdivision (B), all Committee hearings, records, data, charts, and files shall be kept separate and distinct from the congressional office records of the Member serving as its Chairman. Such records shall be the property of the House, and each Member, Delegate, and the Resident Commissioner, shall have access thereto.

(B) A Member, Delegate, or Resident Commissioner, other than Members of the Committee on Standards of Official Conduct, may not have access to the records of the Committee respecting the conduct of a Member, Delegate, Resident Commissioner, officer, or employee of the House without the specific prior permission of the Committee.

Publication of Committee Hearings and Markups

(w) The transcripts of those hearings conducted by the Committee shall be published as a substantially verbatim account of remarks actually made during the proceedings, subject only to technical, grammatical, and typographical corrections authorized by the person making the remarks involved. Transcripts of markups shall be recorded and published in the same manner as hearings before the Committee and shall be included as part of the legislative report unless waived by the Chairman. [XI 2(e)(1)(A)]

Committee Website

(x) The Chairman shall maintain an official Committee website for the purpose of furthering the Committee's legislative and oversight responsibilities, including communicating information about the Committee's activities to Committee Members and other Members of the House. The Ranking Minority Member may maintain a similar website for the same purpose, including communicating information about the activities of the Minority to Committee Members and other Members of the House.

RULE 3. SUBCOMMITTEES

Structure and Jurisdiction

(a) The Committee shall have the following standing Subcommittees with the jurisdiction indicated.

(1) Subcommittee on Energy and Environment

Legislative jurisdiction and general oversight and investigative authority on all matters relating to energy research, development, and demonstration and projects thereof, commercial application of energy technology, and environmental research including:

- Department of Energy research, development, and demonstration programs;
- Department of Energy laboratories;
- Department of Energy science activities;
- energy supply activities;
- nuclear, solar and renewable energy, and other advanced energy technologies;
- uranium supply and enrichment, and Department of Energy waste management and environment, safety, and health activities as appropriate;
- fossil energy research and development;
- clean coal technology;
- energy conservation research and development;
- energy aspects of climate change;
- pipeline research, development, and demonstration projects;
- energy and environmental standards;
- energy conservation including building performance, alternate fuels for and improved efficiency of vehicles, distributed power systems, and industrial process improvements;

- Environmental Protection Agency research and development programs;
- National Oceanic and Atmospheric Administration, including all activities related to weather, weather services, climate, and the atmosphere, and marine fisheries, and oceanic research;
- risk assessment activities; and
- scientific issues related to environmental policy, including climate change.

(2) Subcommittee on Technology and Innovation

Legislative jurisdiction and general oversight and investigative authority on all matters relating to competitiveness, technology, standards, and innovation:

- standardization of weights and measures including technical standards, standardization, and conformity assessment;
- measurement, including the metric system of measurement;
- the Technology Administration of the Department of Commerce;
- the National Institute of Standards and Technology;
- the National Technical Information Service;
- competitiveness, including small business competitiveness;
- tax, antitrust, regulatory and other legal and governmental policies as they relate to technological development and commercialization;
- technology transfer including civilian use of defense technologies;
- patent and intellectual property policy;
- international technology trade;
- research, development, and demonstration activities of the Department of Transportation;
- surface and water transportation research, development, and demonstration programs;
- earthquake programs (except for NSF) and fire research programs including those related to wildfire proliferation research and prevention;
- biotechnology policy;
- research, development, demonstration, and standards related activities of the Department of Homeland Security;
- Small Business Innovation Research and Technology Transfer; and
- voting technologies and standards.

(3) Subcommittee on Research and Science Education

Legislative jurisdiction and general oversight and investigative authority on all matters relating to science policy and science education including:

- Office of Science and Technology Policy;
- all scientific research, and scientific and engineering resources (including human resources), math, science and engineering education;
- intergovernmental mechanisms for research, development, and demonstration and cross-cutting programs;
- international scientific cooperation;
- National Science Foundation, including NSF earthquake programs;
- university research policy, including infrastructure and overhead;
- university research partnerships, including those with industry;
- science scholarships;
- issues relating to computers, communications, and information technology;
- research and development relating to health, biomedical, and nutritional programs;
- to the extent appropriate, agricultural, geological, biological and life sciences research; and
- materials research, development, and demonstration and policy.

(4) Subcommittee on Space and Aeronautics

Legislative jurisdiction and general oversight and investigative authority on all matters relating to astronautical and aeronautical research and development including:

- national space policy, including access to space;
- sub-orbital access and applications;
- National Aeronautics and Space Administration and its contractor and government-operated laboratories;
- space commercialization including the commercial space activities relating to the Department of Transportation and the Department of Commerce;
- exploration and use of outer space;
- international space cooperation;
- National Space Council;
- space applications, space communications and related matters;
- Earth remote sensing policy;
- civil aviation research, development, and demonstration;
- research, development, and demonstration programs of the Federal Aviation Administration; and
- space law.

(5) Subcommittee on Investigations and Oversight

General and special investigative and oversight authority on all matters within the jurisdiction of the Committee on Science and Technology.

Referral of Legislation

(b) The Chairman shall refer all legislation and other matters referred to the Committee to the Subcommittee or Subcommittees of appropriate primary and secondary jurisdiction within two (2) weeks unless the Chairman deems consideration is to be by the Full Committee. Subcommittee Chairmen may make requests for referral of specific matters to their Subcommittee within the two (2) week period if they believe Subcommittee jurisdictions so warrant.

Ex-Officio Members

(c) The Chairman and Ranking Minority Member shall serve as ex-officio Members of all Subcommittees and shall have the right to vote and be counted as part of the quorum and ratios on all matters before the Subcommittee.

Procedures

(d) No Subcommittee shall meet for markup or approval when any other Subcommittee of the Committee or the Full Committee is meeting to consider any measure or matter for markup or approval.

(e) Each Subcommittee is authorized to meet, hold hearings, receive evidence, and report to the Committee on all matters referred to it. For matters within its jurisdiction, each Subcommittee is authorized to conduct legislative, investigative, forecasting, and general oversight hearings; to conduct inquiries into the future; and to undertake budget impact studies. Subcommittee Chairmen shall set meeting dates after consultation with the Chairman and other Subcommittee Chairmen with a view toward avoiding simultaneous scheduling of Committee and Subcommittee meetings or hearings wherever possible.

(f) Any Member of the Committee may have the privilege of sitting with any Subcommittee during its hearings or deliberations and may participate in such hearings or deliberations, but no such Member who is not a Member of the Subcommittee shall vote on any matter before such Subcommittee, except as provided in Rule 3(c).

(g) During any Subcommittee proceeding for markup or approval, a record vote may be had at the request of one (1) or more Members of that Subcommittee.

RULE 4. REPORTS

Substance of Legislative Reports

(a) The report of the Committee on a measure which has been approved by the Committee shall include the following, to be provided by the Committee:

(1) the oversight findings and recommendations required pursuant to Rule X 2(b)(1) of the Rules of the House of Representatives, separately set out and identified [XIII, 3(c)];

(2) the statement required by section 308(a) of the *Congressional Budget Act of 1974*, separately set out and identified, if the measure provides new budget authority or new or increased tax expenditures as specified in [XIII, 3(c)(2)];

(3) with respect to reports on a bill or joint resolution of a public character, a “Constitutional Authority Statement” citing the specific powers granted to Congress by the Constitution pursuant to which the bill or joint resolution is proposed to be enacted.

(4) with respect to each record vote on a motion to report any measure or matter of a public character, and on any amendment offered to the measure or matter, the total number of votes cast for and against, and the names of those Members voting for and against, shall be included in the Committee report on the measure or matter;

(5) the estimate and comparison prepared by the Committee under Rule XIII, clause 3(d)(2) of the Rules of the House of Representatives, unless the estimate and comparison prepared by the Director of the Congressional Budget Office prepared under subparagraph 2 of this Rule has been timely submitted prior to the filing of the report and included in the report [XIII, 3(d)(3)(D)];

(6) in the case of a bill or joint resolution which repeals or amends any statute or part thereof, the text of the statute or part thereof which is proposed to be repealed, and a comparative print of that part of the bill or joint resolution making the amendment and of the statute or part thereof proposed to be amended [Rule XIII, clause 3];

(7) a transcript of the markup of the measure or matter unless waived under Rule 2(v); and,

(8) a statement of general performance goals and objectives, including outcome-related goals and objectives, for which the measure authorizes funding. [XIII, 3(c)]

(b) The report of the Committee on a measure which has been approved by the Committee shall further include the following, to be provided by sources other than the Committee:

(1) the estimate and comparison prepared by the Director of the Congressional Budget Office required under section 403 of the *Congressional Budget Act of 1974*, separately set out and identified, whenever the Director (if timely, and submitted prior to the filing of the report) has submitted such estimate and comparison of the Committee [XIII, clauses 2-4];

(2) if the Committee has not received prior to the filing of the report the material required under paragraph (1) of this Rule, then it shall include a statement to that effect in the report on the measure.

Minority and Additional Views [XI 2(l)]

(c) If, at the time of approval of any measure or matter by the Committee, any Member of the Committee gives notice of intention to file supplemental, Minority, or additional views, that Member shall be entitled to not less than two (2) subsequent calendar days after the day of such notice (excluding Saturdays, Sundays, and legal holidays) in which to file such views, in writing and signed by that Member, with the Clerk of the Committee. All such views so filed by one (1) or more Members of the Committee shall be included within, and shall be a part of, the report filed by the Committee with respect to that measure or matter. The report of the Committee upon that measure or matter shall be printed in a single volume which shall include all supplemental, Minority, or additional views, which have been submitted by the time of the filing of the report, and shall bear upon its cover a recital that any such supplemental, Minority, or additional views (and any material submitted under Rule 4(b)(1)) are included as part of the report. However, this rule does not preclude (1) the immediate filing or printing of a Committee report unless timely request for the opportunity to file supplemental, Minority, or additional views has been made as provided by this Rule or (2) the filing by the Committee of any supplemental report upon any measure or matter which may be required for the correction of any technical error in a previous report made by that Committee upon that measure or matter.

(d) The Chairman of the Committee or Subcommittee, as appropriate, shall advise Members of the day and hour when the time for submitting views relative to any given report elapses. No supplemental, Minority, or additional views shall be accepted for inclusion in the report if submitted after the announced time has elapsed unless the Chairman of the Committee or Subcommittee, as appropriate, decides to ex-

tend the time for submission of views beyond the two (2) subsequent calendar days after the day of notice, in which case he shall communicate such fact to Members, including the revised day and hour for submissions to be received, without delay.

Consideration of Subcommittee Reports

(e) After ordering a measure or matter reported, a Subcommittee shall issue a Subcommittee report in such form as the Chairman shall specify. Reports and recommendations of a Subcommittee shall not be considered by the Full Committee until after the intervention of 48 hours, excluding Saturdays, Sundays and legal holidays, from the time the report is submitted and made available to Full Committee membership and printed hearings thereon shall be made available, if feasible, to the Members, except that this rule may be waived at the discretion of the Chairman after consultation with the Ranking Minority Member.

Timing and Filing of Committee Reports [XIII]

(f) It shall be the duty of the Chairman to report or cause to be reported promptly to the House any measure approved by the Committee and to take or cause to be taken the necessary steps to bring the matter to a vote. To the maximum extent practicable, the written report of the Committee on such measures shall be made available to the Committee membership for review at least 24 hours in advance of filing.

(g) The report of the Committee on a measure which has been approved by the Committee shall be filed within seven (7) calendar days (exclusive of days on which the House is not in session) after the day on which there has been filed with the Clerk of the Committee a written request, signed by the majority of the Members of the Committee, for the reporting of that measure. Upon the filing of any such request, the Clerk of the Committee shall transmit immediately to the Chairman of the Committee notice of the filing of that request.

(h)(1) Any document published by the Committee as a House Report, other than a report of the Committee on a measure which has been approved by the Committee, shall be approved by the Committee at a meeting, and Members shall have the same opportunity to submit views as provided for in Rule 4(c).

(2) Subject to paragraphs (3) and (4), the Chairman may approve the publication of any document as a Committee print which in his discretion he determines to be useful for the information of the Committee.

(3) Any document to be published as a Committee print which purports to express the views, findings, conclusions, or recommendations of the Committee or any of its Subcommittees must be approved by the Full Committee or its Subcommittees, as applicable, in a meeting or otherwise in writing by a majority of the Members, and such Members shall have the right to submit supplemental, Minority, or additional views for inclusion in the print within at least 48 hours after such approval.

(4) Any document to be published as a Committee print other than a document described in paragraph (3) of this Rule: (A) shall include on its cover the following statement: "This document has been printed for informational purposes only and does not represent either findings or recommendations adopted by this Committee;" and (B) shall not be published following the sine die adjournment of a Congress, unless approved by the Chairman of the Full Committee after consultation with the Ranking Minority Member of the Full Committee.

(i) A report of an investigation or study conducted jointly by this Committee and one (1) or more other Committee(s) may be filed jointly, provided that each of the Committees complies independently with all requirements for approval and filing of the report.

(j) After an adjournment of the last regular session of a Congress sine die, an investigative or oversight report approved by the Committee may be filed with the Clerk at any time, provided that if a Member gives notice at the time of approval of intention to file supplemental, Minority, or additional views, that Member shall be entitled to not less than seven (7) calendar days in which to submit such views for inclusion with the report.

(k) After an adjournment sine die of the last regular session of a Congress, the Chairman may file the Committee's Activity Report for that Congress under clause 1(d)(1) of Rule XI of the Rules of the House with the Clerk of the House at anytime and without the approval of the Committee, provided that a copy of the report has been available to each Member of the Committee for at least seven (7) calendar days

and that the report includes any supplemental, Minority, or additional views submitted by a Member of the Committee. [XI 1(d), XI 1(d)(4)]

Oversight Reports

(l) A proposed investigative or oversight report shall be considered as read if it has been available to the Members of the Committee for at least 24 hours (excluding Saturdays, Sundays, or legal holidays except when the House is in session on such day). [XI 1(b)(2)]

LEGISLATIVE AND OVERSIGHT JURISDICTION OF THE COMMITTEE ON SCIENCE AND TECHNOLOGY

Rule X. Organization of Committees.

Committees and their legislative jurisdictions.

1. There shall be in the House the following standing Committees, each of which shall have the jurisdiction and related functions assigned to it by this clause and clauses 2, 3, and 4. All bills, resolutions, and other matters relating to subjects within the jurisdiction of the standing Committees listed in this clause shall be referred to those Committees, in accordance with clause 2 of rule XII, as follows:

o) Committee on Science and Technology.

(1) All energy research, development, and demonstration, and projects thereof, and all federally owned or operated non-military energy laboratories.

(2) Astronautical research and development, including resources, personnel, equipment, and facilities.

(3) Civil aviation research and development.

(4) Environmental research and development.

(5) Marine research.

(6) Commercial application of energy technology.

(7) National Institute of Standards and Technology, standardization of weights and measures and the metric system.

(8) National Aeronautics and Space Administration.

(9) National Space Council.

(10) National Science Foundation.

(11) National Weather Service.

(12) Outer space, including exploration and control thereof.

(13) Science Scholarships.

(14) Scientific research, development, and demonstration, and projects thereof.

SPECIAL OVERSIGHT FUNCTIONS

3.(k) The Committee on Science and Technology shall review and study on a continuing basis laws, programs, and Government activities relating to non-military research and development."

Date	Committee on Science and Technology List of Hearings with Publication Numbers plus List of Legislative Reports filed in the 110th Congress	Publication Number
Jan. 24, 2007	H.R. 365, Methamphetamine Mediation Research Act of 2007; H.Res. 59, Supporting the Goals and Ideals of National Engineering Week; and H.Con.Res. 34, Honoring the Life of Percy Lavon Julian (Markup held by the Committee on Science and Technology.)	H.Rept. 110–8 (H.R. 365) H.Rept. 110–5 (H.Res. 59) H.Rept. 110–4 (H.Con.Res. 34)
Jan. 30, 2007	H.R. 547, the Advanced Fuels Infrastructure Research and Development Act (Hearing held by the Subcommittee on Energy and Environment.)	110–1
Jan. 31, 2007	H.R. 547, the Advanced Fuels Infrastructure Research and Development Act (Markup held by the Committee on Science and Technology.)	H.Rept. 110–7 (H.R. 547)
Feb. 8, 2007	The State of Climate Change Science 2007: The Findings of the Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC), Working Group I Report (Hearing held by the Committee on Science and Technology.)	110–2 w/110–20, 110–30
Feb. 13, 2007	National Imperatives for Earth and Climate Science Research and Applications Investments Over the Next Decade (Hearing held by the Committee on Science and Technology.)	110–3
Feb. 13, 2007	Amending Executive Order 12866: Good Governance or Regulatory Usurpation? Part I (Hearing held by the Subcommittee on Investigations and Oversight.)	110–4 w/110–21
Feb. 14, 2007	The Administration's Fiscal Year 2008 Research and Development Budget Proposal (Hearing held by the Committee on Science and Technology.)	110–5

Date	Committee on Science and Technology List of Hearings with Publication Numbers plus List of Legislative Reports filed in the 110th Congress	Publication Number
Feb. 15, 2007	The National Institute of Standards and Technology's Role in Supporting Economic Competitiveness in the 21st Century: The Fiscal Year 2008 Budget Request (Hearing held by the Subcommittee on Technology and Innovation.)	110-6
Feb. 28, 2007	H.R. 363, Sowing the Seeds Through Science and Engineering Research Act; H.R. 1068, To amend the High-Performance Computing Act of 1991; H.R. 1126, To reauthorize the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988; H.R. 85, Energy Technology Transfer Act (Markup held by the Committee on Science and Technology.)	H.Rept. 110-39 (H.R. 363) H.Rept. 110-40 (H.R. 1068) H.Rept. 110-41 (H.R. 1126) H.Rept. 110-38 (H.R. 85)
Mar. 7, 2007	The Department of Energy Fiscal Year 2008 Research and Development Budget Proposal (Hearing held by the Subcommittee on Energy and Environment.)	110-7
Mar. 8, 2007	The Department of Homeland Security's R&D Budget Priorities for Fiscal Year 2008 (Hearing held by the Subcommittee on Technology and Innovation.)	110-8
Mar. 8, 2007	Improving the Laboratory Experience for America's High School Students (Hearing held by the Subcommittee on Research and Science Education.)	110-9
Mar. 13, 2007	Science and Technology Leadership in a 21st Century Global Economy (Hearing held by the Committee on Science and Technology.)	110-10
Mar. 14, 2007	The Environmental Protection Agency Fiscal Year 2008 Research and Development Budget Proposal (Hearing held by the Subcommittee on Energy and Environment.)	110-11

Date	Committee on Science and Technology List of Hearings with Publication Numbers plus List of Legislative Reports filed in the 110th Congress	Publication Number
Mar. 15, 2007	NASA's Fiscal Year 2008 Budget Request (Hearing held by the Committee on Science and Technology.)	110–12
Mar. 20, 2007	National Science Foundation Reauthorization: Part I (Hearing held by the Subcommittee on Research and Science Education.)	110–13 w/110–19
Mar. 21, 2007	Perspectives on Climate Change (Joint Hearing held by the Subcommittee on Energy and Air Quality, Committee on Energy and Commerce, and the Subcommittee on Energy and Environment.)	110–14
Mar. 22, 2007	The Federal Aviation Administration's R&D Budget Priorities for Fiscal Year 2008 (Hearing held by the Subcommittee on Space and Aeronautics.)	110–15
Mar. 22, 2007	The National Oceanic and Atmospheric Adminis- tration (NOAA) Fiscal Year 2008 Budget Proposal (Hearing held by the Subcommittee on Energy and Environment.)	110–16
Mar. 28, 2007	Markup of H.R. 362, 10,000 Teachers, 10 Million Minds Science and Math Scholarship Act; H.Con.Res. 76, Honoring the 50th Anniversary of the International Geophysical Year (IGY) and its past contributions to space research, and looking forward to future accomplishments; H.Res. 252, Recognizing the 45th Anniversary of John Herschel Glenn, Jr.'s historic achievement in becoming the first United States astronaut to orbit the Earth (Markup held by the Committee on Science and Technology.)	H.Rept. 110–85 (H.R. 362)
Mar. 28, 2007	Shaping the Message, Distorting the Science: Media Strategies to Influence Science Policy (Hearing held by the Subcommittee on Investigations and Oversight.)	110–17

Date	Committee on Science and Technology List of Hearings with Publication Numbers plus List of Legislative Reports filed in the 110th Congress	Publication Number
Mar. 29, 2007	The Joint Planning and Development Office and the Next Generation Air Transportation System: Status and Issues (Hearing held by the Subcommittee on Space and Aeronautics.)	110–18
Mar. 29, 2007	National Science Foundation Reauthorization: Part II (Hearing held by the Subcommittee on Research and Science Education.)	110–19 w/110–13
Apr. 17, 2007	The State of Climate Change Science 2007: The Findings of the Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC), Working Group II: Climate Change Impacts, Adaptation and Vulnerability (Hearing held by the Committee on Science and Technology.)	110–20 w/110–2, 110–30
Apr. 19, 2007	H.R. 1868, Technology Innovation and Manufacturing Stimulation Act of 2007 (Markup held by the Subcommittee on Technology and Innovation.)	H.Rept. 110–115 (H.R. 1868)
Apr. 19, 2007	H.R. 1867, National Science Foundation Reauthorization Act of 2007 (Markup held by the Subcommittee on Research and Science Education.)	H.Rept. 110–114 (H.R. 1867)
Apr. 25, 2007	H.R. 1867, National Science Foundation Reauthorization Act of 2007; H.R. 1868, Technology Innovation and Manufacturing Stimulation Act of 2007; H.Con.Res. 95, Honoring the career and research accomplishments of Frances E. Allen, the 2006 recipient of the A.M. Turing Award; H.Res. 316, Congratulating the achievement of Roger D. Kornberg, Andrew Fire, Craig Mello, John C. Mather, and George F. Smoot for being awarded Nobel Prizes in science (Markup held by the Committee on Science and Technology.)	H.Rept. 110–114 (H.R. 1867) H.Rept. 110–115 (H.R. 1868)

Date	Committee on Science and Technology List of Hearings with Publication Numbers plus List of Legislative Reports filed in the 110th Congress	Publication Number
Apr. 26, 2007	Amending Executive Order 12866: Good Governance or Regulatory Usurpation? Part II (Hearing held by the Subcommittee on Investigations and Oversight.)	110–21 w/110–4
Apr. 26, 2007	Establishing the Advanced Research Projects Agency–Energy (ARPA–E)—H.R. 364 (Hearing held by the Subcommittee on Energy and Environment.)	110–22
Apr. 26, 2007	Small Business Innovation Research Reauthorization on the 25th Program Anniversary (Hearing held by the Subcommittee on Technology and Innovation.)	110–23 w/110–43
May 2, 2007	NASA's Space Science Programs: Review of Fiscal Year 2008 Budget Request and Issues (Hearing held by the Subcommittee on Space and Aeronautics.)	110–24
May 3, 2007	Transitioning the Environmental Measurements Laboratory to the Department of Homeland Security (Hearing held by the Subcommittee on Investigations and Oversight.)	110–25
May 3, 2007	Reorienting the U.S. Global Change Research Program Toward a User-driven Research Endeavor: H.R. 906 (Hearing held by the Subcommittee on Energy and Environment.)	110–26
May 10, 2007	H.R. 632, the H–Prize Act of 2007; H.R. 364, Providing for the establishment of an Advanced Research Projects Agency for Energy (Markup held by the Subcommittee on Energy and Environment.)	H.Rept. 110–171 (H.R. 632)
May 10, 2007	Green Transportation Infrastructure: Challenges to Access and Implementation (Hearing held by the Subcommittee on Technology and Innovation.)	110–27

Date	Committee on Science and Technology List of Hearings with Publication Numbers plus List of Legislative Reports filed in the 110th Congress	Publication Number
May 15, 2007	Federal STEM Education Programs: Educators' Perspectives (Hearing held by the Subcommittee on Research and Science Education.)	110–28 w/110–35
May 15, 2007	Prospects for Advanced Coal Technologies: Efficient Energy Production, Carbon Capture and Sequestration (Hearing held by the Subcommittee on Energy and Environment.)	110–29
May 16, 2007	The State of Climate Change Science 2007: The Findings of the Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC), Working Group III: Mitigation of Climate Change (Hearing held by the Committee on Science and Technology.)	110–30 w/110–2, 110–20
May 17, 2007	Building and Maintaining a Healthy and Strong NASA Workforce (Hearing held by the Subcommittee on Space and Aeronautics.)	110–31
May 17, 2007	Developing Untapped Potential: Geothermal and Ocean Power Technologies (Hearing held by the Subcommittee on Energy and Environment.)	110–32
May 23, 2007	Markup of H.R. 364, Providing for the establishment of an Advanced Research Projects Agency for Energy; H.R. 1467, the 10,000 Trained by 2010 Act; H.R. 1716, the Green Energy Education Act of 2007; H.R. 632, the H-Prize Act of 2007 (Markup held by the Committee on Science and Technology.)	H.Rept. 110–172 (H.R. 1467) H.Rept. 110–173 (H.R. 1716) H.Rept. 110–171 (H.R. 632)

Date	Committee on Science and Technology List of Hearings with Publication Numbers plus List of Legislative Reports filed in the 110th Congress	Publication Number
May 24, 2007	The NASA Administrator's Speech to Office of Inspector General Staff, the Subsequent Destruction of Video Records, and Associated Matters (Hearing held by the Subcommittee on Investigations and Oversight.)	110-33
June 5, 2007	The Role of Technology in Reducing Illegal Filesharing: A University Perspective (Hearing held by the Committee on Science and Technology.)	110-34
June 6, 2007	H.R. 906, Global Change Research and Data Management Act of 2007; H.R. 2304, Advanced Geothermal Energy Research and Development Act of 2007; H.R. 2313, Marine Renewable Energy Research and Development Act of 2007 (Markup held by the Subcommittee on Energy and Environment.)	H.Rept. 110-605, Pt. 1 (H.R. 906) H.Rept. 110-203 (H.R. 2304) H.Rept. 110-202 (H.R. 2313)
June 6, 2007	Federal STEM Education Programs (Hearing held by the Subcommittee on Research and Science Education.)	110-35 w/110-28
June 7, 2007	The Status Report on the NPOESS Weather Satellite Program (Hearing held by the Subcommittee on Energy and Environment.)	110-36
June 7, 2007	Oversight Review of the Investigation of the NASA Inspector General (Joint hearing held by the Senate Subcommittee on Space, Aeronautics, and Related Sciences and the Subcommittee on Investigations and Oversight.)	110-37
June 12, 2007	The duPont Aerospace DP-2 Aircraft (Hearing held by the Subcommittee on Investigations and Oversight.)	110-38

Date	Committee on Science and Technology List of Hearings with Publication Numbers plus List of Legislative Reports filed in the 110th Congress	Publication Number
June 12, 2007	The Globalization of R&D and Innovation, Part I (Hearing held by the Committee on Science and Technology.)	110–39 w/110–49, 110–62, 110–71
June 13, 2007	Markup of H.R. 2304, Advanced Geothermal Energy Research and Development Act of 2007; H.R. 2313, Marine Renewable Energy Research and Development Act of 2007 (Markup held by the Committee on Science and Technology.)	H.Rept. 110–203 (H.R. 2304) H.Rept. 110–202 (H.R. 2313)
June 14, 2007	H.R. 2698, Federal Aviation Research and Development Reauthorization Act of 2007 (Markup held by the Subcommittee on Space and Aeronautics.)	H.Rept. 110–329 (H.R. 2698)
June 14, 2007	A Path Toward the Broader Use of Biofuels: Enhancing the Federal Commitment to Research and Development to Meet the Growing Need (Hearing held by the Subcommittee on Energy and Environment.)	110–40
June 19, 2007	Research, Education and Training Programs to Facilitate Adoption of Solar Energy Technologies (Hearing held by the Subcommittee on Energy and Environment.)	110–41
June 19, 2007	The Role of Community Colleges and Industry in Meeting the Demands for Skilled Production Workers and Technicians in the 21st Century Economy (Hearing held by the Subcommittee on Research and Science Education.)	110–42
June 21, 2007	Markup of H.R. 2773, Biofuels Research and Development Enhancement Act; H.R. 1933, Department of Energy Carbon Capture and Storage Research, Development, and Demonstra- tion Act of 2007; H.R. 2774, Solar Energy Research and Advancement Act of 2007 (Markup held by the Subcommittee on Energy and Environment.)	H.Rept. 110–302 (H.R. 2773) H.Rept. 110–301 (H.R. 1933) H.Rept. 110–303 (H.R. 2774)

Date	Committee on Science and Technology List of Hearings with Publication Numbers plus List of Legislative Reports filed in the 110th Congress	Publication Number
June 22, 2007	Markup on H.R. 2698, Federal Aviation Research and Development Reauthorization Act of 2007; H.Res. 487, Recognizing the contribution of modeling and simulation technology to the security and prosperity of the United States, and recognizing modeling and simulation as a national critical technology (Markup held by the Committee on Science and Technology.)	H.Rept. 110–329 (H.R. 2698)
June 26, 2007	SBIR and STTR—How Are the Programs Managed Today? (Hearing held by the Subcommittee on Technology and Innovation.)	110–43 w/110–23
June 27, 2007	Markup of H.R. 906, Global Change Research and Data Management Act of 2007; H.R. 1933, Department of Energy Carbon Capture and Storage Research, Development, and Demonstration Act of 2007; H.R. 2773, Biofuels Research and Development Enhancement Act; H.R. 2774, Solar Energy Research and Advancement Act of 2007 (Markup held by the Committee on Science and Technology)	H.Rept. 110–605, Pt. 1 (H.R. 906) H.Rept. 110–301 (H.R. 1933) H.Rept. 110–302 (H.R. 2773) H.Rept. 110–303 (H.R. 2774)
June 28, 2007	NASA's Earth Science and Applications Programs: Fiscal Year 2008 Budget Request and Issues (Hearing held by the Subcommittee on Space and Aeronautics.)	110–44
July 11, 2007	Markup of H.R. 2337, Energy Policy Reform and Revitalization Act of 2007; H.R. 2850, Green Chemistry Research and Development Act of 2007 (Markup held by the Committee on Science and Technology.)	
July 12, 2007	Markup of H.R. 2337, Energy Policy Reform and Revitalization Act of 2007 (Markup held by the Committee on Science and Technology.)	

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July 17, 2007	The Bayh-Dole Act (P.L. 96-517, Amendments to the Patent and Trademark Act of 1980)—The Next 25 Years (Hearing held by the Subcommittee on Technology and Innovation.)	110-46
July 19, 2007	Tracking the Storm at the National Hurricane Center (Joint Hearing held by the Subcommittee on Energy and Environment and the Subcommittee on Investigations and Oversight.)	110-47
July 24, 2007	NASA's Space Shuttle and International Space Station Programs: Status and Issues (Hearing held by the Subcommittee on Space and Aeronautics.)	110-48
July 26, 2007	The Globalization of R&D and Innovation, Part II: The University Response (Hearing held by the Committee on Science and Technology.)	110-49 w/110-39, 110-62, 110-71
August 1, 2007	The Department of Energy's Support for the Savannah River Ecology Laboratory (SREL), Part II (Joint hearing held by the Subcommittee on Investigations and Oversight and the Subcommittee on Energy and Environment.)	110-50 w/110-45
Sept. 5, 2007	The Benefits and Challenges of Producing Liquid Fuel From Coal: The Role for Federal Research (Hearing held by the Subcommittee on Energy and Environment.)	110-51

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Sept. 27, 2007	The National Security Implications of Climate Change (Hearing held by the Subcommittee on Investigations and Oversight.)	110–58
Oct. 2, 2007	The United States Fire Administration Reauthorization: Addressing the Priorities of the Nation's Fire Service (Hearing held by the Subcommittee on Technology and Innovation.)	110–59
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Oct. 4, 2007	The Globalization of R&D and Innovation, Part III: How Do Companies Choose Where to Build R&D Facilities? (Hearing held by the Subcommittee on Technology and Innovation.)	110-62 w/110-39, 110-49, 110-71
Oct. 10, 2007	Assessment of the National Science Board's Action Plan for STEM Education (Hearing held by the Subcommittee on Research and Science Education.)	110-63
Oct. 10, 2007	Markup of H.R. 1834, Ocean Exploration and Undersea Research Act; Discussion Draft—Energy Storage Technology DAdvancement Act of 2007; Discussion Draft—Industrial Energy Efficiency R&D Act of 2007 (Markup held by the Subcommittee on Energy and Environment.)	H.Rept. 110-311, Pt. 2 (H.R. 1834)
Oct. 16, 2007	Markup of H.R. 3776, Energy Storage Technology Advancement Act of 2007; H.R. 3775, Industrial Energy Efficiency Research and Development Act of 2007 (Markup held by the Committee on Science and Technology.)	H.Rept. 110-402 (H.R. 3776) H.Rept. 110-401 (H.R. 3775)
Oct. 17, 2007	Disappearing Polar Bears and Permafrost: Is a Global Warming Tipping Point Embedded in the Ice? (Hearing held by the Subcommittee on Investigations and Oversight.)	110-64

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Oct. 31, 2007	Research on Environmental and Safety Impacts of Nanotechnology: Current Status of Planning and Implementation Under the National Nanotechnology Initiative (Hearing held by the Subcommittee on Research and Science Education.)	110–69
Oct. 31, 2007	Aviation Safety: Can NASA Do More to Protect the Public? (Hearing held by the Committee on Science and Technology.)	110–70
Nov. 6, 2007	The Globalization of R&D and Innovation, Part IV: Implications for the Science and Engineering Workforce (Hearing held by the Subcommittee on Technology and Innovation.)	110–71 w/110–39, 110–49, 110–62

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Nov. 15, 2007	Next Generation Border and Maritime Security Technologies: H.R. 3916 (Hearing held by the Subcommittee on Technology and Innovation.)	110–73
Feb. 7, 2008	Markup of H.R. 3916, the Border Security Technology Innovation Act of 2008 H.R. 4847, the United States Fire Administration Reauthorization Act of 2008; H.R. 5161, the Green Transportation Infrastructure Research and Technology Transfer Act (Markup held by the Subcommittee on Technology and Innovation.)	H.Rept. 110–684 (H.R. 3916) H.Rept. 110–559 (H.R. 4847) H.Rept. 110–576 (H.R. 5161)
Feb. 7, 2008	Status of Visas and Other Policies for Foreign Students and Scholars (Hearing held by the Subcommittee on Research and Science Education.)	110–74
Feb. 13, 2008	NASA's Fiscal Year 2009 Budget Request (Hearing held by the Committee on Science and Technology.)	110–75
Feb. 14, 2008	Funding for the America COMPETES Act in the Fiscal Year 2009 Administration Budget Request (Hearing held by the Committee on Science and Technology.)	110–76
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Feb. 29, 2008	Energizing Houston: Sustainability, Technological Innovation, and Growth in the Energy Capital of the World (Field Hearing held by the Subcommittee on Energy and Environment.)	110-79
Mar. 5, 2008	The Department of Energy Fiscal Year 2009 Research and Development Budget Proposal (Hearing held by the Subcommittee on Energy and Environment.)	110-80
Mar. 6, 2008	The Department of Homeland Security's R&D Budget Priorities for Fiscal Year 2009 (Hearing held by the Subcommittee on Technology and Innovation.)	110-81
Mar. 11, 2008	The Transfer of National Nanotechnology Initiative Research Outcomes for Commercial and Public Benefit (Hearing held by the Subcommittee on Research and Science Education.)	110-82
Mar. 11, 2008	NIST's FY 2009 Budget Request: What Are the Right Technology Investments to Promote U.S. Innovation and Competitiveness? (Hearing held by the Subcommittee on Technology and Innovation.)	110-83

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Mar. 13, 2008	The Environmental Protection Agency (EPA) Library Closures: Better Access for a Broader Audience? (Hearing held by the Subcommittee on Investigations and Oversight.)	110–85
Mar. 13, 2008	NASA's Science Programs: Fiscal Year 2009 Budget Request and Issues (Hearing held by the Subcommittee on Space and Aeronautics.)	110–86
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Apr. 15, 2008	The Department of Energy's FutureGen Program (Hearing held by the Subcommittee on Energy and Environment.)	110–92

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Apr. 24, 2008	Aviation Security Research and Development at the Department of Homeland Security (Hearing held by the Subcommittee on Technology and Innovation.)	110–97
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May 7, 2008	Markup of H.R. 5940, National Nanotechnology Initiative Amendments Act of 2008 (Markup held by the Committee on Science and Technology.)	H.Rept. 110–682 (H.R. 5940)
May 8, 2008	Fulfilling the Potential of Women in Academic Science and Engineering Act of 2008 (Hearing held by the Subcommittee on Research and Science Education.)	110–100
May 12, 2008	STEM Education Before High School: Shaping Our Future Science, Technology, Engineering and Math Leaders of Tomorrow By Inspiring Our Children Today (Field Hearing held by the Committee on Science and Technology.)	110–101
May 14, 2008	Water Supply Challenges for the 21st Century (Hearing held by the Committee on Science and Technology.)	110–102
May 20, 2008	Markup of H.R. 6063, the National Aeronautics and Space Administration Authorization Act of 2008 (Markup held by the Subcommittee on Space and Aeronautics.)	H.Rept. 110–702 (H.R. 6063)
May 21, 2008	The National Sea Grant College Program Act: H.R. 5618 (Hearing held by the Subcommittee on Energy and Environment.)	110–103
May 21, 2008	EPA's Restructured IRIS System: Have Polluters and Politics Overwhelmed Science? (Hearing held by the Subcommittee on Investigations and Oversight.)	110–104 w/110–108

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June 4, 2008	Markup of H.R. 6063, the National Aeronautics and Space Administration Authorization Act of 2008 (Markup held by the Committee on Science and Technology.)	H.Rept. 110–702 (H.R. 6063)
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June 12, 2008	Toxic Communities: How EPA's IRIS Program Fails the Public (Hearing held by the Subcommittee on Investigations and Oversight.)	110–108 w/110–104
June 18, 2008	Markup of H.R. 4174, the Federal Ocean Acidification Research and Monitoring Act of 2007; H.R. 5618, the National Sea Grant College Program Amendments Act of 2008; H.R. 6323, Heavy Duty Hybrid Vehicle Research, Development, and Demonstration Act of 2008 (Markup held by the Subcommittee on Energy and Environment.)	H.Rept. 110–749 (H.R. 4174) H.Rept. 110–701, Pt. 2 (H.R. 5618) H.Rept. 110–855 (H.R. 6323)
June 19, 2008	An Insecure Forecast for Continuity of Climate and Weather Data: The NPOESS Weather Satellite Program (Hearing held by the Subcommittee on Energy and Environment.)	110–109
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July 15, 2008	The Role of Non-governmental Organizations and Universities in International Science and Technology Cooperation (Hearing held by the Subcommittee on Research and Science Education.)	110–114
July 15, 2008	The Low-level Plutonium Spill at NIST–Boulder: Contamination of Lab and Personnel (Hearing held by the Subcommittee on Technology and Innovation.)	110–115
July 16, 2008	Markup of H.R. 3957, the Water Use Efficiency and Conservation Research Act; H.R. 2339, the Produced Water Utilization Act of 2007; H.R. 6323, To establish a research of appropriate technologies for heavy-duty plug-in- hybrid vehicles (Markup held by the Committee on Science and Technology.)	H.Rept. 110–802 (H.R. 3957) H.Rept. 110–801 (H.R. 2339) H.Rept. 110–855 (H.R. 6323)

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